

Electronic Register **MultiFlow**



Further documentation for this product:

Description	Order No.
MultiFlow Quick Guide	MN F09 012 US / DOK-392E
MultiFlow Calibration – Information for W&M Inspector	MN F09 010 US / DOK-389E

History

Revision	Date	Editor	Status	Description
Rev. 1.00	June 2003	HO	released	- first edition
Rev. 3.54	April 2009	GE / RL / jp	released	- format modifications / new Drawings - update Version 3.54
Rev. 3.55	September 2009	GE / RL / jp	released	- Upgrading of the Technical Data Chapter 12 by line Functional safety
Rev. 3.56	July 2010	GE / RL / jp	released	- Updated Drawings: 61.352108 / 61.352110 / 61.351763 / 61.351771
Rev. 3.57	August 2010	JS / jp	released	- New Drawings: 61.352218 / 61.352217 (variant 4) - New chapter: 2.6 Safety instructions
Rev. 3.58	February 2011	JS / jp	released	- Description new Software Version 3.59 u. 5.02 (MID)
Rev. 3.60	September 2011	RLE / jp	released	- Description new Software Version 3.60 u. 5.11 (MID) - Remove turbines and multi-IO support
Rev. 3.61	July 2012	RLE / jp	released	- Description new Software Version 3.61 u. 5.12 (MID) - Transfer logbook data to EMIS2 - MFSI query configuration via EMIS2
Rev. 3.62	March 2013	RLE / jp / elf	released	- Editorial changes - New Tally printer MIP480 - Complete parameter list included - Maintenance plan added

Table of Contents (English)

Table of Contents (English)	3
1 General	14
1.1 Orientation aids for the manual	14
1.2 Valuable Facts about MultiFlow	15
1.3 System Structure	16
1.4 Overview of operating elements	16
1.5 Key character assignment	17
1.5.1 Key assignment	18
1.5.1.1 Entry of text	18
1.6 Quick Start up MultiFlow	19
2 Quick Start	21
3 General Installation Instructions	30
3.1 Preventive Measures	30
3.1.1 To Avoid Accidents (Due to Gas Explosion)	30
3.1.2 To Correspond to Norms	30
3.1.3 To Ensure Trouble-Free Operation	30
3.1.4 To Make Work Easier for Future Users	31
3.1.5 Also to Be Noted	32
3.2 Terminal Box (only AI Version)	32
3.3 Printer Connection	33
3.4 Routing the Cables in the Vehicle	33
3.5 Maintenance	34
3.5.1 Batteries	34
3.5.2 Maintenance plan	36
3.6 Safety instructions	36
3.6.1 Ex protection	36
3.6.2 Special requirements	36
3.6.3 Operating elements	37
3.6.4 Disposal	37
3.6.4.1 Disposal of production materials and auxiliary materials	37
3.6.4.2 Disposal of a functional component or system	37
3.6.5 Proper intended use	38
4 General User Instructions	39
4.1 Menu Structure	39
4.1.1 Setup Menu (after switching on)	39

4.1.1.1	Setup Display Menu <F1>	40
4.1.1.2	Test Reader Menu <F2>	42
4.1.2	Main Menu (Function Key <F3>)	43
4.1.3	Report Printouts (Key <Print>)	44
5	Initial Operation	45
5.1	Version Numbers	45
5.2	Reading in New Program Versions (Update)	46
5.2.1	Carrying Out a Program Update	47
5.2.1.1	MultiFlow up to version 5.00	48
5.2.1.2	MultiFlow from version 5.00	48
5.3	Initialization	50
5.4	Chip Card Reader	50
5.5	Overview	51
5.6	Installation	52
5.7	Diagnosis	55
5.7.1	Inputs and Outputs	56
5.7.2	Printer	59
5.7.2.1	Loop-Back Test	59
5.7.3	CAN Bus	61
5.7.3.1	Testing Links	61
5.7.4	Remote control	61
5.7.4.1	Check function	62
5.7.4.2	Message meanings	64
5.7.5	EPE2	65
5.7.6	IO Interface	66
5.7.7	Sensor interface	67
6	Discharge	69
6.1	Carrying Out a Discharge (Part 1)	69
6.2	Carrying Out a Discharge (Part 2)	70
6.2.1	Selecting a New Product	70
6.3	Measuring system residue removal (optional)	71
6.3.1	MultiFlow up to version 5.00	71
6.3.2	MultiFlow from version 5.00	72
6.4	Electronic hose selection (optional)	76
6.5	Carrying Out a Discharge (Part 3)	77
6.6	Printing Delivery Notes and Invoices	79
6.6.1	Using the Printer	80
6.6.2	Replacing a Ribbon	81

6.7	Discharge operated remotely.....	82
6.8	Discharge in OBC operating modes.....	83
6.8.1	Office communication via EMIS	84
6.9	Monitoring the Load.....	86
6.10	Product Transfer / Self Loading.....	87
6.11	MultiFlow emergency power supply MF-EPS (MID version only)	88
6.12	Emergency power supply – Battery change - MF-EPS.....	90
7	Product Definition	92
7.1	Define a New Product	93
7.2	Additive Dispensing.....	96
7.2.1	Activating the Additive Pump	96
7.2.2	Defining the Additive / Product Containing Additive.....	98
7.2.3	Defining the Additive Use	101
7.3	Product restrictions	102
8	W&M Calibration	104
8.1	Calibrating the measuring system	104
8.2	Securing the settings on a chip card (MID version only)	107
8.3	Resetting the download logbook (MID version only)	109
8.4	Electronic W & M seal (soft seal)	109
8.4.1	Setting of the plug-in jumper	112
8.5	Print-out of electronic W & M seal	114
9	Configuration of the MultiFlow	115
9.1	Display Configuration	116
9.2	Device Settings.....	116
9.2.1	Grand Totals.....	116
9.3	Parameter List	117
9.3.1	Device Settings	118
9.3.1.1	Device Number.....	118
9.3.1.2	Meter Designation	118
9.3.1.3	Seal Password	118
9.3.1.4	Operating options.....	118
9.3.1.4.1	Customization (Control Options)	121
9.3.1.4.2	Notes on the Second Currency	122
9.3.1.4.3	Notes on pre-set options	123
9.3.1.4.4	Notes on Query Options	123
9.3.1.4.5	Customer Type Query	124
9.3.1.4.6	Payment mode query.....	125
9.3.1.4.7	Notes on Billing.....	126
9.3.1.4.8	No-load Measurement	126

9.3.1.4.9	The OBC summary	130
9.3.1.5	W & M Restrictions	131
9.3.1.5.1	Access density	131
9.3.1.6	CAN-Bus (global)	133
	Remote operation	133
	Overfill prevention.....	133
	Dead man's switch	133
	EPE2.....	134
	Sensor interface	134
	Sensors	134
	IO interface	135
9.3.1.7	CAN Bus (local).....	138
9.3.1.7.1	Notes on the CAN Bus Connection	138
9.3.1.8	Valve Control.....	141
	Flow Control	141
	Draining	141
	Overfill prevention.....	143
9.3.1.8.1	Notes on the manual control of the hoses	143
9.3.1.8.2	Notes on the full electronic control of the hoses.....	143
9.3.1.8.3	Notes on overfill prevention	146
9.3.1.8.4	Notes on blow down	146
9.3.1.8.5	Notes on Flow Control	147
9.3.1.9	Receipt ID.....	148
9.3.2	Printer Settings.....	149
9.3.2.1	Notes on parity check for FDW	149
9.3.2.2	Note about printing via can bus.....	150
9.3.3	Sensors	150
9.3.3.1	Pulse inputs.....	150
9.3.3.1.1	Notes on the pulse transmitter.....	150
9.3.3.2	Temperature Sensor	151
9.3.3.2.1	Temperature Sensor (PT 100).....	152
9.3.3.2.2	Working Without a Temperature Sensor	152
9.3.3.3	Additive Pump (also called “dosage pump” or “Injection pump”)	153
9.3.3.3.1	Notes on the pump position	153
9.3.3.3.2	Information regarding hose volume	154
9.3.4	Form Description	154
9.3.5	Product Definition	154
9.3.6	Driver List	155
9.3.6.1	Driver Register (36n..)	155

9.3.6.2	Defining the Driver's Name	156
9.4	Service Menu	157
9.4.1	Electronic seal	157
9.4.2	Calibration	157
9.4.3	Diagnosis.....	157
9.4.4	Initialize	158
9.4.5	Chip card	158
9.4.6	Program update.....	158
9.4.7	Checksums.....	158
9.5	Logon	159
9.6	Load Monitor.....	159
9.7	Flush measuring system	159
9.7.1	In OBC mode.....	159
9.8	Residue removal via EPE2	160
9.9	Units.....	161
9.10	Product Registers (35nn..)	162
9.10.1	Note regarding product group "Direct linear"	164
9.10.2	Notes on the hose set	165
9.10.3	Notes on scale prices	165
9.10.4	Notes on minimum product temperature	165
9.11	Notes on Parameter Checks	166
9.12	Saving Parameters on the Chip Card.....	168
9.12.1	Saving the Parameters.....	169
9.12.2	Loading the Parameters from the Chip Card	170
9.13	Namur sensor interface - MFSI	171
9.13.1	Functional Description.....	172
9.13.1.1	Turn-on phase	172
9.13.1.2	Online mode	173
9.13.1.3	Logbook data.....	173
9.13.2	Configuration of the device	175
9.13.2.1	Sensor interface	175
9.13.2.2	MultiFlow	176
9.13.3	Configuration of the sensors	178
9.13.4	Sensor monitor	180
9.14	IO Interface - MFIO2	182
9.14.1	IO Interface Functional Description - MFIO2.....	182
9.14.1.1	Link	183
9.14.1.2	Additional hose path.....	183

9.14.1.3	Idle operation.....	184
9.14.2	Configuration of the device	184
9.14.2.1	IO Interface.....	184
9.14.2.2	MultiFlow	185
9.14.3	Configuration of the outputs	186
9.14.3.1	Linking the outputs	186
9.14.3.2	Additional hose path.....	187
10	Form Description	190
10.1	Defining a Receipt (Delivery Receipt or Invoice)	190
10.1.1	W & M Requirements	191
10.1.2	Entry Dialogue.....	191
10.1.2.1	Positioning on the Receipt	193
10.1.2.2	Form modification After Sealing	194
10.1.2.3	Example of a Receipt	195
10.1.3	Summary of Text Modules	195
10.1.3.1	Description of Text Modules.....	197
10.1.3.2	Placeholders.....	200
10.1.3.3	Options	201
10.1.3.4	Attributes	201
10.1.3.5	Minimum Layout	202
10.1.3.6	Sum Blocks	204
10.1.4	Control Printout	204
10.2	Definition of an original delivery note (OBC operation).....	207
10.2.1	Format	208
10.2.2	Header.....	209
10.3	Printer Settings.....	209
11	Printing out Reports	212
11.1	Trip Report	213
11.1.1	Trip Reports on the Chip Card	213
11.1.1.1	Saving the Trip Report	214
11.1.1.2	Large Quantities of Data	215
11.2	Short Report	215
11.3	Detailed Report.....	216
11.4	Copy Receipt	218
11.5	Zero Bill	218
11.6	Parameter List	219
11.6.1	Printout of Parameter List (example)	219
11.6.2	Printout "Driver list"	221

11.6.3	Printout „Receipt Title“	221
11.7	Event report	222
11.7.1	Log Book	224
11.8	Office transfer	230
11.9	Update report (example)	232
11.10	Sensor monitor status report	233
11.11	Event report, sensor monitor	235
12	Error messages and status information	237
13	Technical Data	243
13.1	MultiFlow	243
13.2	MultiFlow Control Device	244
13.3	Operating Device	245
13.4	Printer DR-295 FDW	245
13.5	Printer DR-298 FDW	245
13.6	Printer EPSON TM-U295	246
14	Miscellaneous Information	247
14.1	Abstract from ElexV (§12)	247
14.2	Extract from the Preliminary Certificate	247
14.3	DIL Switch Settings for DR-290/DR295	249
14.4	DIL switch settings for DR-298-FDW	249
14.5	DIL Switch Settings of TM-U220	250
14.6	DIL switch settings TM-U295	251
14.6.1	MultiFlow versions up to V3.48	251
14.6.2	MultiFlow versions from V3.49	252
14.7	TALLY printer MIP 480 – Settings and parameterization	253
14.7.1	Printer keys	253
14.7.2	Changing the parity in the “INSTALL” Setup mode	254
14.7.3	Switch from continuous-forms paper to single sheet	255
14.7.4	Changing the form length in “MACRO” Setup mode	255
	Print menu form length	255
	Change setting from 11 inch to 12 inch	255
14.7.5	MultiFlow parameterization	256
14.8	Printer TM-U295 - Information on DC converter DCV 75-24-24	256
14.9	Program versions	257
14.9.1	Version 2.00	257
14.9.2	Version 2.20	258
14.9.3	Version 3.00	258
14.9.4	Version 3.04	258

14.9.5	Version 3.10	258
14.9.6	Version 3.15	259
14.9.7	Version 3.20	259
14.9.8	Version 3.30	259
14.9.9	Version 3.40	259
14.9.10	Version 3.45	260
14.9.11	Version 3.48	260
14.9.12	Version 3.49	261
14.9.13	Version 3.50	261
14.9.14	Version 3.54	261
14.9.15	Version 3.59	262
14.9.16	Version 3.60	263
14.9.17	Version 3.61	263
14.9.18	Version 5.00 (MID)	263
14.9.19	Version 5.01 (MID)	264
14.9.20	Version 5.05 (MID)	265
14.9.21	Version 5.06 (MID)	265
14.9.22	Version 5.07 (MID)	265
14.9.23	Version 5.08 (MID)	266
14.9.24	Version 5.09 (MID)	266
14.9.25	Version 5.10 (MID)	266
14.9.26	Version 5.11 (MID)	266
14.9.27	Version 5.12 (MID)	267
15	Software update	268
15.1	Initial remarks	268
15.2	Software update by download	268
15.2.1	Hazard notes	268
15.2.2	Required hardware	269
15.2.3	Procedure	269
15.3	Software update by exchanging the EPROM chip	273
15.4	Disassembly of the Ex-housing	277
15.5	Spare Parts	278
16	Character sets available for the MultiFlow	279
16.1	PC437 character set	279
16.2	PC852 character set	280
16.3	PC866 character set	281
17	Address and contact details	283
	Relation of Functions to Drawing Numbers	285

AI version.....	285
AIII version.....	285
Display Configuration / Device Settings	286
Categories Of Parameters.....	286
Operating Options	287
W & M Restrictions	289
CAN-Bus (global)	290
Remote operation	290
Overfill prevention.....	290
Dead man's switch	290
EPE2.....	291
Sensor interface	291
Sensors	291
IO interface	292
CAN-Bus (lokal)	295
Valve Control.....	295
Flow Control	296
Draining	296
Overfill prevention.....	297
Receipt ID	298
Printer Settings	298
Pulse inputs	299
Temperature Sensor.....	299
Additive Pump (also called "Dosage Pump" or "Injection Pump").....	300
Form Description	300
Product Definition.....	300
Product Registers (35nn..).....	301
Driver List	303
Driver Register (36n..)	303
Electronic Seal	304
Calibration	304
Diagnosis.....	304
Initialize.....	304
Chip Card.....	305
Program Update.....	305
Checksums.....	305
Sensor Monitor	305
Product Definition.....	306
Printer Settings	306
Index	308

Drawings	311
E61.350979 - MultiFlow complete - Weather-proof housing (AIII version)	311
E51.350956 - Wiring Diagram for MultiFlow (AIII version)	312
E51.351989 - Wiring diagram Dosage pump ADD350 and MultiFlow AIII	313
E51.351125 - Wiring diagram electronic control + dosage pump + overfill prevention amplifier	314
E51.351127 - Wiring diagram electronic control + flow control	315
E51.351691 - MultiFlow AIII Wiring diagram electronic control, with flow control + dosage pump + overfill prevention amplifier	316
E52.350953 - Sealing Arrangement for MultiFlow (AIII version) – page 1	317
E52.350953 - Sealing Arrangement for MultiFlow (AIII version) – page 2	318
E51.351100- Disassembly of the Ex-housing	319
E61.350992 - MultiFlow complete explosion-proof housing (AI version)	320
E51.350958 - Wiring Diagram for MultiFlow (AI version)	321
E51.351190 - MultiFlow AI Wiring diagram pneum. control switch + dosage pump	322
E51.351189 - MultiFlow AI Wiring diagram electronic control + dosage pump + overfill prevention amplifier	323
E51.351126 - MultiFlow AI Wiring diagram electronic control + flow control	324
E51.351692 - MultiFlow AI Wiring diagram electronic control with flow control + dosage pump + overfill prevention amplifier	325
E52.351015 - Wiring diagram RS232 - Interface (AI version)	326
E51.351988 - Wiring diagram Dosage pump ADD150 and MultiFlow AI	327
E61.352218 - EMIS and FlowComputer Basic Component Layout (Variant 4)	328
E61.352217 - Basic Wiring Diagram EMIS and FlowComputer (Variant 4)	329
E51.352078- Emergency power supply MF-EPS	330
E51.352088 - Emergency power supply for the flow computer MultiFlow of a MID system	331
E52.350952 - Sealing Arrangement for MultiFlow AI - page 1	332
E52.350952 - Sealing Arrangement for MultiFlow AI - page 2	333
E51.350931 - Sensor, pre approval Connection Thread G3/4	334
E51.250828 - Pneumatic circuit diagram for delivery	335
E51.250842 - Pneumatic circuit diagram Meter package with tank truck computer (TMU)	336
E51.250857 - Pneumatic circuit diagram, Meter package with tank truck computer (TMU + AS)	337
E51.351143 - Block diagram Overfill prevention amplifier type ASE-D-MF	338
E51.351740 - Solenoid valves connection diagrams & order codes	339
E61.351994 - EPE2 connection to residue discharge (with MultiFlow)	340
E61.352182 - MultiFlow Namursensor-Interface complete - MFSI	341
E51.352198 - Wiring diagram Namursensor-Interface - MFSI	342
E51.352180 - MultiFlow - I/O-Interface complete - MFIO2	343
E51.352197 - Wiring diagram I/O-Interface - MFIO2	344

Approvals **345**

 E W & M seal form (blank DOK-386E)345

 W & M seal form (blank DOK-503)346

 Further authorisation documents.....347

 EC-Declaration of Conformity MultiFlow348

1 General

1.1 Orientation aids for the manual

We have provided some orientation aids so that you can easily find the necessary information in this manual.

The information in this manual ranges from imperative safety procedures and standardized guidelines through to concrete handling procedures and advice. To differentiate these more easily, the information is marked with corresponding pictograms in front of the relevant text.

These are intended not just to draw particular attention to these passages, but also to make it easier to find the information you want. Therefore the pictograms are symbolic of the underlying textual content.

The following pictograms are used in this manual:



Danger sign

Danger of explosions caused by easily ignited gases and liquids here.



Risk of operating fault

Actions that may damage the equipment.



Legal notice

Actions that may have legal consequences.



Working step

Concrete action statements, e.g.: *"Press the <Enter> key"*.



Input necessary

e.g. via numeric or function keys.



Positive response message

e.g. "The main menu now appears"



Negative response message

e.g. "If a fault message appears now..."



Background information

Short-Tip, e.g. "See more detailed information in chapter XX".



Option

Special case.



Function

Functional description.



NOTE:

indicates a special situation.



ATTENTION:

particular attention is to be paid.

1.2 Valuable Facts about MultiFlow

The MultiFlow has been developed according to the latest state of technology, incorporating many years of experience in the application of electronic metering.

Due to standardization of electronic metering devices within the European Union development is taking place strictly to the latest regulations for the approval of meters for W & M regulated applications within the EU (OIML R117). This guarantees that the MultiFlow will fulfil the present and also future legal requirements for meters for applications subject to Weights & Measures inspection.

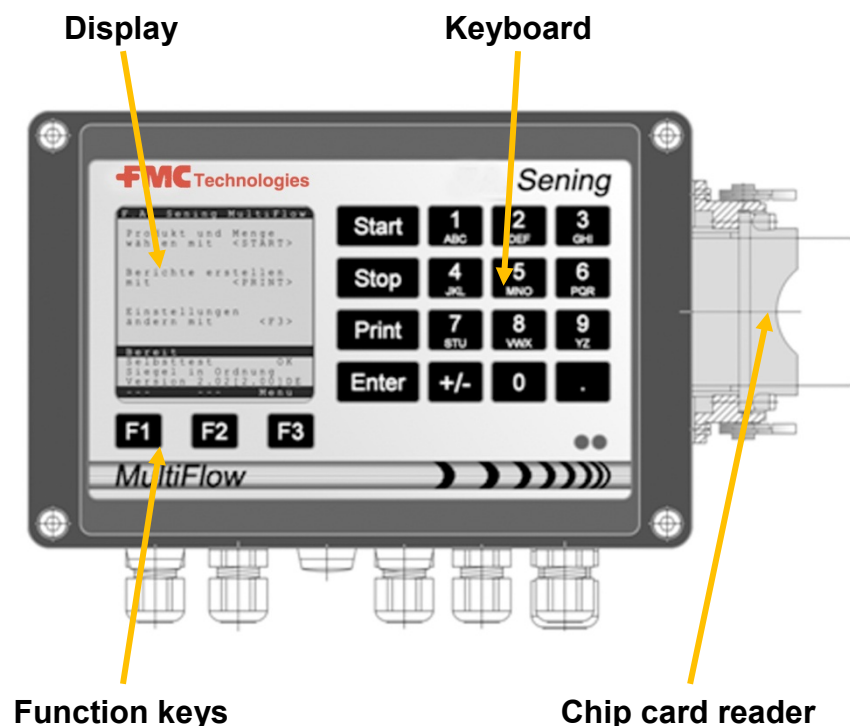
Apart from the display with text output, which has now become a standard, the MultiFlow development includes the following features:

- The MultiFlow has one pulse input for a 2-channel pulse transmitter. The output switching stage of the pulse transmitter (PNP, NPN or F. A. Sening two-wire THS pulse transmitter) can be set on the MultiFlow using software (Parameter).
- The printer interface (RS-232, RS-422 or RS-485) is set to the desired type of connection by software. Since the setting here is also using SW, there are no jumpers or links to be set.
- All switching outputs are electronically protected against short circuit. The affected output becomes operational again once the short circuit is removed. It is not necessary to change any fuses
- An economical data interface from the vehicle to the office is provided by the use of an industry-compatible chip-card reader. The reading device conforms to IP65 class of protection and is implemented in the intrinsically safe type of explosion protection. The reader can therefore be also used in Ex areas without any special protective measures.
- The MultiFlow has four intrinsically safe inputs for the connection of switches for use in Ex areas without special protective measures.
- The MultiFlow communicates to other FAS-devices via the CAN Bus system which has become a standard on motor vehicles.
- The printer can be connected without a special interface.
- A feature of the MultiFlow is its compact design (also in the AI version) which saves costs and weight.
- When changing the program, it is no longer necessary to open up the device to change the EPROM. The new program is simply transferred from a Personal Computer into the MultiFlow via the printer interface.
- Switches and jumpers within the device have been eliminated in order to make the MultiFlow easy to install and configure. All settings on the communication interface are carried out by software. Therefore, there is the possibility of connecting the most varied types of printer interface to the MultiFlow printer output.
- Operation is menu-guided and all output is shown in plain text.
- Operation is available in a number of languages. Three languages are permanently installed as standard.

1.3 System Structure

- The MultiFlow is available in the **AIII** version (heating oil, diesel) or in the **AI** version (petrol, kerosene).
- With the **AIII** version the complete control electronics with the operating device is accommodated in one housing.
- The supply voltage, printer connection and the sensors are connected directly in the device on plug-in connectors secured with screws.
- The connectors can be simply pulled off for test purposes and a test adapter can be plugged to the post terminal strip. So all device functions can be checked in the mounted state in an easy manner.
- In the **AI** version the MultiFlow control electronics is mounted in a flameproof enclosure which is supplied with voltage in an intrinsically safe manner from the operating device.
- The connection of the non-intrinsically safe inputs and outputs is made in a terminal box with increased safety features.
- Due to the pull-spring terminal technique used here, there is no need to tighten wire ends in terminals. Loose terminal connections are therefore a thing of the past.
- Furthermore, installation is substantially simplified due to the improved access to the terminals.


1.4 Overview of operating elements







1.5 Key character assignment

1 ABC	Letter group A; B; C; 1 or a; b; c; 1 Upper and lowercase selection with F1
2 DEF	Letter group D; E; F; 2 or d; e; f; 2 Upper and lowercase selection with F1
3 GHI	Letter group G; H; I; 3 or g; h; i; 3 Upper and lowercase selection with F1
4 JKL	Letter group J; K; L; 4 or j; k; l; 4 Upper and lowercase selection with F1
5 MNO	Letter group M; N; O; 5 or m; n; o; 5 Upper and lowercase selection with F1
6 PQR	Letter group P; Q; R; 6 or p; q; r; 6 Upper and lowercase selection with F1
7 STU	Letter group S; T; U; 7 or s; t; u; 7 Upper and lowercase selection with F1
8 VWX	Letter group V; W; X; 8 or v; w; x; 8 Upper and lowercase selection with F1
9 YZ	Letter group Y; Z; 9; <Space character> or y; z; 9; <Space character> Upper and lowercase selection with F1
F1	Function key <F1> , assignment depends on program, defined via SW
F2	Function key <F2> , assignment depends on program, defined via SW
F3	Function key <F3> , assignment depends on program, defined via SW
+/-	Character group # ° ℓ \$ £ % & - +
0	Special characters Ö; Ä; Ü; ä; ö; ü; ß ; The special characters depend on the selected language.
.	Character group : , ; / ! ? = . ()
Start	Start of discharge, acceptance of packed products on the invoice or the delivery receipt
Stop	Stops discharge, goes back one menu point
Print	Triggers printout, confirmation of entered values for some entries; see "Reports", page 44
Enter	Acceptance of entered values, confirmation of values


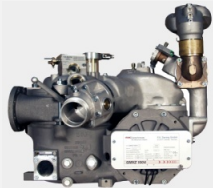
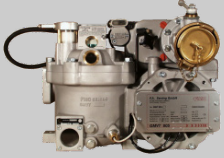



1.5.1 Key assignment



-  Apart from the entry of numbers, the keys can also be used for the entry of letters or special characters. All the characters used can be printed out. The letters and special characters assigned to the keys are listed in the table in chapter 1.5 "Key character assignment" / page 17.

1.5.1.1 Entry of text

-  To enter text, locate the required character below the number.
-  Press this key briefly and repeatedly until the required character appears in the text field.
-  If you discontinue pressing the key for a longer time, the character shown in the display is accepted and the cursor moves automatically one step further waiting for the next character to be entered.
-  You can use function key <F2> to delete the last letter entered.

1.6 Quick Start up MultiFlow

Steps	1.	2.	3.	4.	5.	6.	7.	8.
	Date & Time	Meter Designation	Path Selection	Hose Set	Printer	Pulse Rating	Max. Error Pulses	Sensor Type
Parameter	1.2.	3.1.2.	3.1.8.1	3.1.8.7	3.2.1	3.3.1.1	3.3.1.3	3.3.1.4
Push F3 for Menu, than the numbers. For one step back please push the Stop button								
 GMVZ 1004	Set date and time before sealing!	You'll find the meter number on the name plate	Choose No. 2 for one stage valve or No. 3 for two stage valve (Hi-Low Flow)	Defines the hose path that are used in the measuring system (B =Bypass / G =Dry hose gravity / P = Pumped dry hose / U = Unmetered / W = Wet hose	Choose No. 2 for DR-295, No. 3 for DR-298, No. 4 for FX (FDW), No. 5 for ASCII, No. 6 for TM-U220, No. 7 for TM-U295, No. 8 for ---, No. 9 No. for No Printer	5,528	11	Choose No. 3 for THS type
 GMVT 805						8,415	17	
 T 11- J						15,1	30	
 T 20- J						8,415	17	
 T 40- J						5,528	11	

-  After setting these 8 parameters the system is ready for calibration. Set the calculated meter factor for **each** product under parameter **3.5.1.X.7.5.1**. The placeholder **X** stands for the product number. (1= Heating Oil / 2 = Diesel etc.). For further information, please compare chapter 9.10 "**Product Registers (35nn..)**" / page 162.
-  For details and further information please use chapter 3 "**General Installation Instructions**" / page 30.

2 Quick Start

1. The main keys

 As a rule, the following functions are assigned to the below keys:

- <Start>** Start discharge
- <Stop>**
 - a) Stop or terminate discharge
 - b) Quit an entry without saving the data
- <Print>**
 - a) Switch to the report selection menu
 - b) Confirm and save entered values
- <Enter>** Go to the next possible entry

2. Discharge



This manual only regards operation of the MultiFlow. Of course, all other conditions concerning the discharge of product have to be met as well.



Switch on the MultiFlow.



The MultiFlow runs a self-test after which it is ready for discharge.




Press the **<Start>** key to start the discharge.





In case hose selection is not available, pass on to "Delivery preset" / p. 22.

FA Sening MULTIFLOW		
Select Product and Volume with	<START>	
Print Reports with	<PRINT>	
Customize Settings with	<F3>	
Ready		
Selftest	OK	
Seal	OK	
Version 5.03 [5.13] UK		
Seal	Load	Menu
F1	F2	F3

3. Delivery preset


 Now the delivery preset menu appears. The selection made before is displayed and the selected hose is marked.

 For MultiFlow units with residue removal control: after entering all the preset values by pressing the **<START>** key, the MultiFlow checks whether a product change has taken place between diesel and heating oil / heating oil with additives. If this is the case, a corresponding message is shown regarding the necessity of residue removal.

 If you want to maintain these settings, continue with "**Start the discharge**" / p. 24.

Delivery Preset	
Customer ID:	000000
Product Code:	>11<
	Heating Oil
Amount:	1000 1
Price per	100 /
w. VAT	\$ 87.65
Wet hose	2
Continue with ENTER	
CNo :	11
--- Clear ---	
F1	F2
	F3

4. Residue removal via EPE2

 The following description is relevant only for program versions from 5.00 (approval according to MID).

No.	Name	Seal	K	Factory setting	Meaning
8	Residue removal EPE2	F			Control of a residue discharge pump connected to the EPE2. For this purpose the "EPE2-AIII" or "EPE2-AI" mode must be activated (parameter 3.1.8.5.1).

“Residue removal EPE2” display

- ▶ The “Residue removal EPE2” menu item (**menu 8**) can be used to carry out the residue removal of the measuring system via a residue discharge pump connected to the EPE2. For this purpose an EPE2 must be connected to the MultiFlow and configured via the CAN bus. The “EPE2-All” (**menu 3.1.8.5.1.4**) or „EPE2-AI“ (**menu 3.1.8.5.1.5**) must also be active.
- ▶ Residue removal is started by activating the <START> key. Activate the <STOP> key once to pause residue removal and once more to cancel.
- ▶ If residue removal is not cancelled manually using <STOP> it is cancelled automatically after a maximum residue removal period defined in the “Residue removal timeout” menu item (**menu 3.1.8.5.2**).

Residue removal EPE2		

Press START to continue		
Press STOP to exit		

Residue removal timeout		
.		
9 min		
F1	F2	F3



During the residue removal through “Residue removal EPE2” (**menu 8**), the residue removal via “EPE2-AI” (**menu 3.1.8.5.1.5**) also monitors the state of the EPE2 sensor. If a complete residue removal cycle is detected, the EPE2 output will be disabled and residue removal will be paused.

5. Hose selection (optional)

- ☐ In software versions lower than 3.10 the electronic hose selection will be carried out before product selection.
- ☐ Now the hose selection menu is displayed. The hose selected earlier is marked.
- ☞ If necessary change the selection by using the keys <F1> or <F2> and select the hose with <Enter>

Hose Selection		
Selection:		
1	Unmetered	
2	Wet hose 1	
3	Wet hose 2	
4	Dry hose	
5	Bypass 1	
6	Bypass 2	

Up	Down	---
F1	F2	F3

- ▶ You can also select the hose by entering the preceding number.



With **<Stop>** you can quit the selection menu at any time.

6. Select a new product (if required)



The actual input line is marked by pointed brackets (**>XX<**).



Correct the input fields. Confirm all entries with **<Enter>**. This takes you automatically to the next input field. The last input field is followed by the first one again.

- ▶ First step:
Specify the product which is identified by its product code.
(Parameters: product page and index).



If you do not know the product code, select the desired product with **<Enter>**.

- ▶ A 3-page selection list of all products then appears automatically which you can open with **<Enter>**. (With **<Stop>** you go back.)



Select the desired **product** with **<Enter>**.

- ▶ The selection is now accepted into the discharge settings.



Second step:
Enter the required discharge quantity. The selected volume must be larger or equal to the minimum discharge volume (cf. parameter list: e.g. 200 L).



Now you enter **price** and **customer ID** in case these options are activated.

- ▶ Should you have made an input error, you can overwrite the faulty value by a new entry, or you can delete the character to the left of the cursor with the key **<F2>** (**'Clear'**).

7. Start the discharge



If all input is correct, you start the discharge with the **<Start>**-key.



This also applies to packed product (additive).

☐ If you have made a faulty entry, the respective input field is marked automatically, enabling you to correct your entry.

☐ The delivery screen is divided into two sections:

- In the **main display** the discharged quantity and compensation mode (compensated/uncompensated) are continuously displayed.

- In the **auxiliary display** additional discharge details, e.g. product temperature and flow rate are displayed.

👁 By pressing <F3> you can switch to several system messages (e.g. the delivery start time).

Delivery		
Heating oil		
Preset:	5500	1

		150
Compensated		ℓ
to 15°C		

Wet hose	2	

Remain:	7:40	min
Actual temp.:	+13.7	°C
w. VAT	67.45	
ℓ/min	703	

---	---	>>
F1	F2	F3

8. Terminate the discharge

☞ By pressing <Stop> the discharge can be interrupted at any time before the preset quantity has been reached.

- ▶ You can continue (with the same preset values) by pressing <Start> again.
- ▶ By pressing <Stop> you terminate the discharge.
- ▶ When the preset amount has been reached, discharge is interrupted and the query: "**Resume discharge?**" appears.

You now decide whether the discharge is to be continued with a new preset:

☞ If you press <F1> for 'Yes'

- ▶ Enter the additional amount to be discharged. Confirm with <Enter>. Press <Start> to resume discharge.
- ▶ Now the discharge is continued until the total preset amount is reached.

☞ If you press <F2> for 'No' the query: "**More products?**" appears.

- ▶ If you answer by pressing <F1> for 'Yes'

- ▶ You select the next product.



The next product has to be identified. You can also change to a packed good (additive). The product code of the desired product is entered as described in **"Select a new product"** / p. 24.

- ▶ If you answer by pressing <F2> for 'No'
- ▶ Print out a delivery note or an invoice.

9. Delivery notes and invoices

If the "Invoice" option has not been released, a delivery note is automatically printed. Otherwise you can select one of the following options:

- ☒ When 'Delivery Note' is selected (<F2>), a delivery note is printed immediately.
- ☒ When 'Invoice' is selected (<F1>), you have the option between private customers "Domestic" (including VAT) and commercial customers "Non-Domestic" (excluding VAT).



Confirm your selection with <Enter>.

- ▶ One after the other the delivered products are now displayed, so that you can either confirm or correct the product prices attributed.



Confirm each correction with <Enter>.

- ▶ Then the next possible input is selected (e.g. Customer No.) and marked by pointed brackets (>...<).
- ▶ If you have made an input mistake you can overwrite the faulty value by entering a new value, or you can delete the character to the left of the cursor by pressing <F2> ('Clear').

When all entries are correct:



Press the <Print> key.

- ▶ Then the next product (if registered) is displayed for confirmation.

Delivery Confirmation	
Customer ID:	123456

Heating Oil	
	150 ℓ
Price per 100 ℓ	
w/o VAT	\$ >45,67

Confirm with PRINT	
\$	87,65

Clear	

F1	F2
F3	

- ▶ After printing the note the device is ready for the next discharge.
- ▶ All delivery data is entered to the logbook.

10. Reports

The MultiFlow offers various reports you can print out to assist you with your daily work.

☒ When you are in the **Ready mode**:



Press the **<Print>** key.

▶ The following menu appears:

▶ You have the following report options:

1. Short report covering a selected time period or range of receipt numbers
2. Detailed report covering a selected time period or a range of receipt numbers
3. Reproduction of stored receipts
4. Print a zero receipt
5. Print the parameter list (also selectively)
6. Print extract from the log book
7. Office link (optional)
8. Reserved
9. Reserved
0. Sensor monitoring and program update

Reports		
Selection: 1		
1	Short report	
2	Detailed report	
3	Copy receipt	
4	Zero receipt	
5	Parameter list	
6	Event report	
7	Office link	
8	(---)	
9	(---)	
0	Miscellaneous	
Up	Down	---
F1	F2	F3



Confirm your selection with **<Enter>**.



Quit the report menu with **<Stop>**.

11. Menu functions







- With the **<F3>** key you activate the MultiFlow menu (in the Start screen) and quit it with the **<Stop>** key.
- The various functions are selected by pressing the numerical keys.
- The major functions are:
 - 11 Screen contrast

- 12 Setting of time and date
- 2 Display the counter readings
- 6 Stock monitoring (optional)

12. Monitoring the load (optional)

The Load management can be found in the **Main Menu** under Item 6 (**Menu 6**). It contains the following information:

<p>Remaining volume in the chamber →</p> <p>Remaining additive volume in the storage container →</p> <p>Trigger alarm on undercutting Of the selected limit →</p> <p>Echo of entered value →</p>	<div style="background-color: black; color: white; text-align: center; padding: 2px;">Load monitor</div> <div style="padding: 5px;"> <p>Product Load: >12345< ℓ</p> <hr style="border-top: 1px dashed black;"/> <p>Additive Load: 100,00 ℓ</p> <p>Alarm at: 5,00 ℓ</p> </div> <div style="background-color: black; color: white; text-align: center; padding: 2px;">Confirm with PRINT</div> <div style="padding: 5px;"> <p>ℓ 12345</p> </div> <div style="background-color: black; color: white; text-align: center; padding: 2px;"> --- Clear --- </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="background-color: black; color: white; padding: 5px 10px; border: 1px solid black;">F1</div> <div style="background-color: black; color: white; padding: 5px 10px; border: 1px solid black;">F2</div> <div style="background-color: black; color: white; padding: 5px 10px; border: 1px solid black;">F3</div> </div>
---	---


-  The entry field “**Product Load**” signifies the current remaining volume in the vehicle compartments.
-  After loading set the initial value for the product.
 - ▶ After each discharge the *uncompensated discharge volume* is subtracted automatically.
-  The remaining Load of additive is displayed in the central display section. The additive is intended for an additive pump controlled by the MultiFlow.
-  After loading set the initial value for the additive.
 - ▶ After each discharge the *uncompensated discharge volume* of the additive is subtracted automatically.
-  The field “**Warning at:**” enables you to define a minimum Load. The additive Load is compared with the minimum volume before each discharge.
-  If the level falls below the limit, a warning is displayed:
“WARNING! Additive Load almost completely used!”

- ▶ This alarm is given to prevent the system from running empty which would involve a refilling procedure.
- ▶ You can deactivate the alarm by setting the minimum volume to zero.

13. Setting the clock

You will find the clock setting in the **main menu** under point 12 (**Menu 12**) which contains the following data:


 The active entry field is set to "**Hour**"

 Here you can adjust the entry from summer to winter time by entering the correct time in numerical value.

- ▶ If you want to adjust the minutes also,
- ▶ press the **<Enter>** key.
- ▶ Now the "**Minute**" field is active.
- ▶ Adjust by entering the correct numerical value.
- ▶ Confirm the entered values by pressing the **<Print>** key.
- ▶ The date may only be adjusted by personnel with a "**Master**" ID. The date is subject to W&M restrictions.


Date and Time		
Day	:	TT
Month	:	MM
Year	:	JJJJ
Hour	:	>hh>
Minute	:	mm
Confirm with PRINT		

Clear		
F1	F2	F3

 You quit the menu by pressing the **<Stop>** key.


14. Alarm messages

Any error occurring, e.g. during discharge, is displayed immediately.

 You confirm that you have taken notice by pressing **<F1>** ('OK'). The device then decides whether to continue the discharge, or to terminate discharge and print a receipt.

Pulse Error !		
OK		

F1	F2	F3

 Alarms (error messages) are recorded in the log book.

3 General Installation Instructions

Apart from the points outlined in the following, all the relevant regulations, such as VDE 0165, must be observed during installation, operation and maintenance. Only if the instructions below are followed, long and trouble-free operation can be ensured.

3.1 Preventive Measures

3.1.1 To Avoid Accidents (Due to Gas Explosion)



Ex-protection regulations must be observed!

If PG glands on AI terminal boxes must be changed, only Ex approved glands must be used.

- It is strongly recommended not to mount the printer outside the driver's cabin, because the printer is not designed for this use, particularly with regard to its protection against humidity, contamination, temperature (ink ribbon freezes at low temperatures) and also on account of the Ex protection.

3.1.2 To Correspond to Norms

- Wiring must be carried out according to the supplied wiring diagrams. All colors are selected according to DIN 47100. Please **absolutely** comply with the given color selections.
- The electrical installation must be carried out according to EN60079-10 / VDE 0165.
- It is not permissible to fit additional components into the MultiFlow housing or in the terminal box (e.g. additional terminals), since this would contravene the device approval.

3.1.3 To Ensure Trouble-Free Operation

- During welding work on the vehicle, the power supply must be disconnected.
- The lead entries must always be mounted at the side or underneath in order to prevent the ingress of water into the housing.
- Unused PG glands on the terminal box or on the MultiFlow must be closed off watertight using blind plugs.
- The terminal and electronics boxes as well as the connectors must be protected against direct water spray (e.g. from the tires).

- All cables must be routed such that they are not damaged or kinked.
- After connecting the wire ends, the screw-secured plug-in connectors on the MultiFlow must be pressed firmly onto the connector strip to prevent them from becoming unintentionally disconnected.
- The supplied blind plugs must be used on **AI** terminal boxes.
- In the **AIII** version all wire ends must be fitted with wire-end sleeves. No wire-end sleeves are required in the terminal box (only version **AI**).
- All electrical connections are implemented in either screw-secured plug-in connectors or terminals. The leads must be introduced into the housing through PG glands appropriate to the lead cross-section. The supplied screwdriver should be used for connection to the screw-secured plug-in connectors. When cutting the wire ends it is essential to make sure that no wire clippings drop into the open device. Otherwise, this may cause short circuits on the circuit board.
- After fitting the wire ends the connector should be plugged onto the matching connector strip on the board and pressed in firmly. For screened leads the screen must be fitted with a 6.3 mm flat connector and plugged onto the flat connector strip for the screen connection. Similarly, the solenoid valves must be plugged at one end onto the flat connector strip provided (0V strip) using a 6.3 mm flat connector.



A connection between the housing/screen and the 0V strip must never be made. If this advice is not followed, problems with the functioning of the device may occur.

- After mounting the wire cores, attach the screw-type plug connector to the corresponding pin strip on the PCB and press it into place firmly. If the line is sheathed, fit the sheath with a 6.3 mm ribbon-type connector and attach it to the ribbon cable connector strip for the shield connection. Also connect one side of the solenoid valves to the ribbon cable connector provided (0V strip) using a 6.3 mm ribbon-type connector.



Never produce a connection between the housing/sheath and the 0V strip. Failure to observe this point can give rise to malfunctions.

- The solenoid valves must be mounted upright, i.e. the solenoid coil must point upwards. (339)
- The printer must always be mounted in the driver's cabin to ensure protection against contamination and humidity.
- Before a new program version (update) is installed, it is essential to print out all remaining reports and receipts, since any data saved may be lost due to the change of program.

3.1.4 To Make Work Easier for Future Users

- Terminal boxes should be fitted allowing easy access.
- The housings of the electronics system should always be accessible.

- Cables without connectors may be shortened.
- The cover mounting screws should be slightly lubricated before fitting (copper paste, graphite grease). Thus corrosion of the screws after long periods of operation is prevented and easy unscrewing enabled.

3.1.5 Also to Be Noted

- If the temperature sensor is disabled (e.g. if gasoline is delivered), then a bridge must be set at the terminals for the temperature sensor (PT100) instead, see drawings 312 and 321.
- In sealed state the seal password (**parameter 3.1.3**), which enables access to the electronic calibration seal, is no longer displayed.



The user who makes a change to the password must ensure that this new password is appropriately documented. Same may, for example, be saved in a closed envelope.

3.2 Terminal Box (only AI Version)

The terminals in the terminal box are not terminals in the usual sense, but terminals with a pull-spring connection. The wires are not screwed as with the previous version, but inserted from the top instead.



A screwdriver with a blade width of 2.5 mm (included in supplied items) is needed to open the pull-springs.

The following working steps are necessary for the secure connection of the wire ends (see Fig. 1):



Strip insulation from the wire end.



It is not necessary to use wire-end sleeves.



Press in the clamp in the terminal using the screwdriver.

- Insert the wire-end into the open terminal.
- Remove the screwdriver.
- Check for firm seating in the terminal by pulling on the wire.

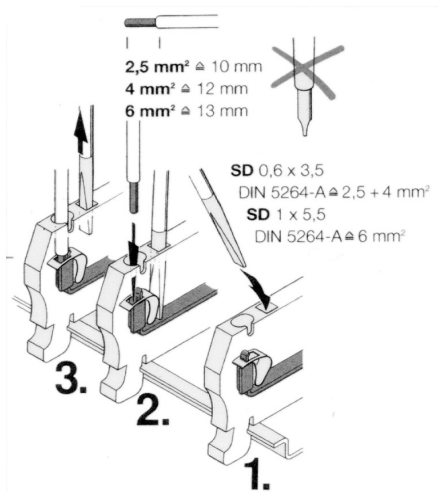


Fig. 1: Pull-Spring Terminals

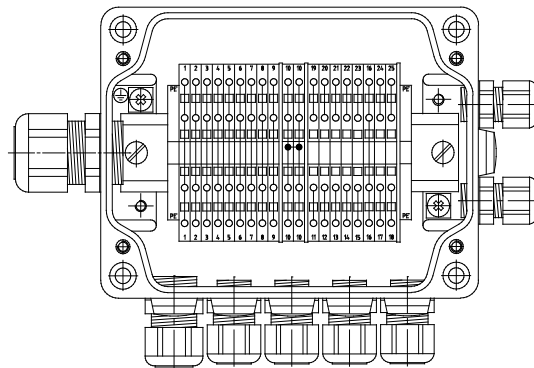


Fig. 2: Terminal Box

3.3 Printer Connection

The printer (DR-295 / DR-298) is directly supplied with a 24V voltage supply from the driver's cabin.



The data leads are connected as usual to the MultiFlow or, with the AI version, to the TXD, RXD and 0V terminals in the terminal box.



If a Tally printer with RS-485 connection is used, the connection must be made according to the supplied circuit diagrams.

3.4 Routing the Cables in the Vehicle

The MultiFlow is a measurement device which has been designed for vehicle use.



To ensure trouble-free operation, a few guidelines, described in the previous sections, must be followed during installation.



If these guidelines are not followed, faults in operation may occur.



Where the guidelines have evidently not been followed or the installation has not been properly carried out (contravention of applicable regulations), we accept no guarantee when faults occur nor any consequential claims arising from them.



Lay an extra supply lead as voltage supply for the MultiFlow.

▶ Use a cable with 1 mm² cross-section.



The cable for voltage supply needs not to be screened.



Use for communication and signal cables only shielded cable. The shield connection is to be connected only at one end of the line to ground.



In vehicles with AI equipment, the relevant Ex installation regulations must be taken into account!



Tap off the voltage of +24V directly from the battery positive pole (Terminal 30) via a fused line using a lead fitted with a separate switch.

- Protect the MultiFlow with a 5 A fuse.
- Tap the 0V line as close as possible to the battery ground connection.
- The printer and the MultiFlow must be supplied from the same power station.



Never supply the printer with external voltage.



If the system is switched off via a switch, the switch must be placed in the +24V supply line only.



The 0V line must not be switched.



If the MultiFlow is mounted on a trailer, only the trailer cable obtainable from F. A. Sening should be used for the voltage supply and the communication line.

3.5 Maintenance

The MultiFlow requires no maintenance. No mechanical or electrical change on the device itself is permitted. If the device becomes dirty, the membrane keypad can be wiped with a mild cleaning agent.



When carrying out cleaning using a steam jet or pressurized water, the device (**AI** and **AIII** versions) must be protected from the water jet. Never point a steam jet directly at the device!



If water has been found to have penetrated into the device due to improper cleaning, a guarantee claim will be rejected.



A regular safety check according to ElexV§12¹ must take place for devices in the version **AI**.

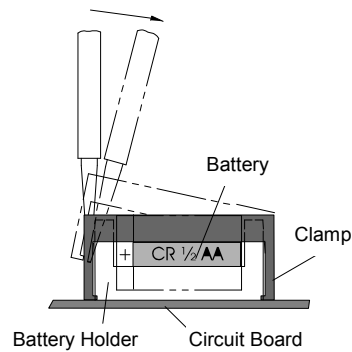
3.5.1 Batteries



The clock integrated into the MultiFlow is supplied from a lithium battery when the MultiFlow is switched off. In normal operation the battery has a

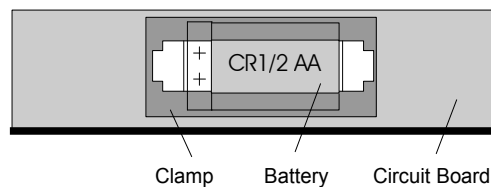
¹ Printout of Section 12 ElexV see Appendix

service life of at least seven years. However, the expected life also depends on the operating conditions such as temperature and turn-on duration of the device, so it is only a theoretical value. To replace the batteries the MultiFlow must be opened and the battery removed as shown in the sketch.



Loosening the clamp with a screwdriver

- ☞ To loosen the clamp, insert the supplied screwdriver into the side slot of the battery compartment.
- ☞ Press the lugs of the clamp outwards with the screwdriver.
- 😊 The side snugs of the clamp are thus pressed out of the latched position.
- ☞ After one side has been loosened, treat the other side in the same way.
- ▶ Then you can lift the clamp.
- ☞ When inserting the new battery, it is essential to ensure correct polarity. A battery of the type Varta CR1/2AA 3V/950mAh should be used.



Plan View of the Battery Holder

- ☞ The time, date and all parameter settings must be reset after replacing the battery (see Chip Card Reader, <dg_ref_source_inline>VW(KTS) ---> Chipkartenleser</dg_ref_source_inline>).
- ☞ Furthermore the device has to be approved by the W & M office.



If the change of the battery is performed within 5 seconds, the data will not be erased!



The date must be adjusted before the W & M seal is set, because it is subject to W & M protection.

3.5.2 Maintenance plan

	Daily	Monthly	Yearly	Other
MultiFlow AI version	-	-	-	x (safety check according to ElexV§12)
Battery change	-	-	-	x (approx. every 7 years)

3.6 Safety instructions



Caution:

This information must be carefully read and observed before operating the unit.

3.6.1 Ex protection



The measuring systems are designed for flow measurements of highly flammable and flammable liquids (hazard classes AI and AIII) on tank trucks. Sparks and naked flames must be strictly avoided.

3.6.2 Special requirements



The measuring systems contain high-precision, high-quality components. Consequently, mechanical actions not directly relating to the operation of the unit (e.g. dropping the unit) must be avoided.



The measuring devices must be properly and officially calibrated. Any manipulation, whether intentional or unintentional, will break the calibration seal.



Make sure that no fuel is allowed to soak or flow into the ground!

3.6.3 Operating elements



CAUTION:

Do not open the housing cover when the unit is connected to the voltage supply!

Work must only be carried out on the EEx-e terminals when the unit is voltage free. National regulations must be satisfied when operation of this unit is begun. When performing operational checks, observe the guidelines laid out in EN 60 079-17.

3.6.4 Disposal

It is the operator's responsibility to obtain the necessary information about all relevant regulations and requirements from your local authorities. Ensure that the relevant materials are disposed of in an environmentally safe fashion.



The operator is responsible for ensuring compliance with all general and local regulations which are in force at the time of disposal.

3.6.4.1 Disposal of production materials and auxiliary materials

- Mineral oil products are extremely hazardous to the environment; they must not be allowed to enter the drains/sewage system or the ground.
- These materials and any objects contaminated with them should be disposed of via suitable waste disposal facilities.



Disposal of batteries

The batteries in the controller should be replaced by a skilled person. Used batteries must not be disposed of as standard domestic waste. Ensure that all used batteries are disposed of via suitable disposal facilities.

3.6.4.2 Disposal of a functional component or system

- When a functional component or system is taken out of service, we recommend that it should be sorted into its different types of waste and then disposed of or recycled as appropriate. Sort and separate iron, nonferrous metals, plastics, electronic waste, etc.

- Fuels, grease, oil and objects or lines contaminated with them must be disposed of separately.

3.6.5 Proper intended use

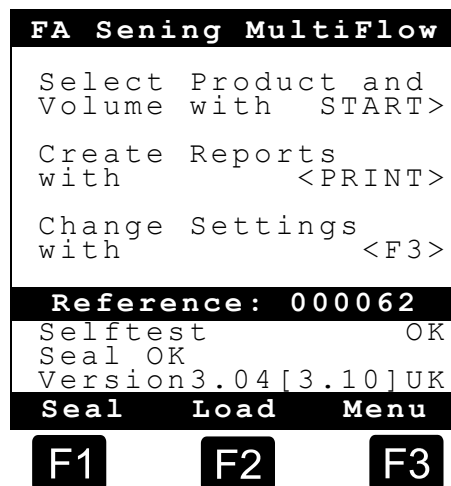
- ☐ The measuring systems are to be used exclusively for delivery of low-viscosity mineral oils on tank trucks. The corresponding applicable safety regulations (e.g. Ex protection) must be complied with.
- ☐ Any form of use which exceeds the scope described above is deemed to be improper use; the manufacturer is not liable for damages resulting from such improper use.
- ☐ Proper use also includes compliance with the conditions set out by the manufacturer with regard to operation, installation and maintenance.
- ☐ The measuring systems must only be operated, serviced and repaired by personnel who are familiar with the equipment and who have been trained regarding the dangers involved.
- ☐ The manufacturer cannot be held liable for any damages arising as a result of unauthorized changes to the measuring systems.

4 General User Instructions

4.1 Menu Structure

Apart from starting the discharge, two menu trees are accessible from Start screen:

Start screen

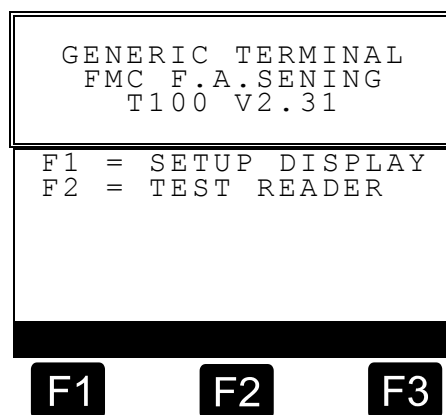


4.1.1 Setup Menu (after switching on)

The setup menu appears after the unit is switched on and remains visible for about 6 seconds. During this period the setup menu for the display can be called up with the function key <F1> or the test reader for the chip card with <F2>.

The setup menu appears immediately after the switching on for about 6 seconds.

SETUP / TEST – Menu





If the display for the setup menu appears noticeably longer than 6 seconds and the main menu is not called up automatically, there is a communication error between the display and the CPU!

4.1.1.1 Setup Display Menu <F1>

By pressing the function key <F1> the SETUP DISPLAY opens up and this screen is shown. From this menu you can access display-specific tests and settings, as well as keyboard tests and basic address settings for the CAN bus.

SETUP / 1 - Menu

The selection of individual menu items is made with the keys <F1> for "up" and <F2> for "down", and you gain access to the second setup page with <F3> for "more". Access into the menu items thus selected is gained with the <Enter> key:



<Display Test>:

In this test all the font options are selected in sequence and presented in the display.



<Master address>:

Setting of the address region (0...9) with <F1> for "plus" and with <F2> for "minus" und <F3> for "end" and adoption of the newly-set value. (default value: „0“)



<Own address>:

Setting of the address region (0...9) with <F1> for "plus" and with <F2> for "minus" und <F3> for "end" and adoption of the newly-set value. (default value: „1“)



<CAN Freq. kHz>:

Setting of the range of values (50 / 100) with <F1> for "plus" and with <F2> for "minus" und <F3> for "end" and adoption of the newly-set value. (default value: „50“)



<Keyboard test>:

A keyboard test can be carried out with this menu item. With each pressing of a key, said key is displayed with its corresponding

GENERIC TERMINAL FMC F.A.SENING T100 V2.31	
Display Test...	
Master address:	0
Own address...	1
CAN Freq. kHz:	50
Keyboard test	:
Contrast	28
Handshake	ON
Beeper	ON
End	:
up	down more
F1	F2 F3

identification. The test can be terminated by pressing the **<Enter>** key twice.



<Contrast>:

The range of values for the contrast of the display lies between (0...100) and is modified with **<F1>** for "light", **<F2>** for "dark" and **<F3>** for "end" and adoption of the newly-set value (default value about: „30“).



<Handshake>:

The handshake setting (ON / OFF) for the CAN bus is modified with **<F1>** for "on", **<F2>** for "off" and **<F3>** for "end" and adoption of the newly-set value (default value: "ON").



<Beeper>:

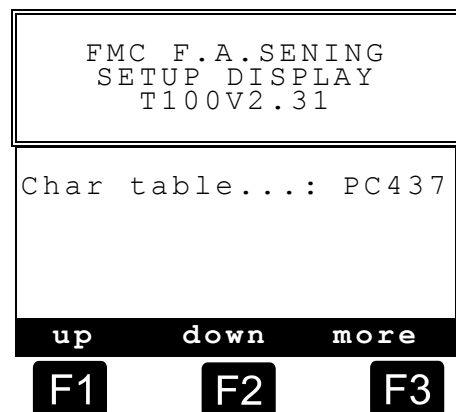
The beeper can be set to (ON / OFF) with **<F1>** for "on", **<F2>** for "off" and **<F3>** for "end" and adoption of the newly-set value (default value: "ON").

SETUP / 2 - Menu



<F3 for „more“>:

Settings for the second set up page.



<Char table>:

Setting of the character sets (PC437, PC852, PC866) with **<F1>** for "plus", **<F2>** for "minus" and **<F3>** for "end" and adoption of the newly-set value (default value: "PC437"). Please also See chapter 16 "**Character sets available for the MultiFlow**" / page 279 for further information.



<F3 for „back“>:

Settings for the first setup page.



<End>:

Leaving the SETUP DISPLAY menu.



The CAN bus settings should only be carried out by competent persons. On this point also See chapter 9.3.1.6 "**CAN-Bus (global)**" / page 133.

4.1.1.2 Test Reader Menu <F2>

After you have selected the chip card test by actuation of the function key <F2> in the setup menu you gain access to this menu and obtain these displays.



In order that the card test can be successfully performed the chip card must first be inserted! Please also See chapter 5.4 "**Chip Card Reader**" / page 50.

TEST READER - Menu



Display if no chip card has been inserted:

CHIP CARD TEST
READ/WRITE AT NO CARD INSERTED
CONTINUE PRESS ENTER
F1 F2 F3

TEST READER - Menu



Display while the card test is running:

CHIP CARD TEST
32 kByte capacity READ/WRITE AT ADDRESS: 21346
TEST IN PROGRESS
F1 F2 F3

- 😊 Display after a successful card test:

CHIP CARD TEST		
32 kByte capacity		
READ/WRITE AT ADDRESS: card O.K.		
TEST IN PROGRESS		
F1	F2	F3

- ☹ Display after an abortive card test:

CHIP CARD TEST		
32 kByte capacity		
ERROR AT ADDRESS: 11233		
TEST IN PROGRESS		
F1	F2	F3

- 👉 After the card test you can exit the TEST READER menu by pressing <Enter>.

4.1.2 Main Menu (Function Key <F3>)

The main menu is reached via function key <F3> in the start screen and enables configuration of the MultiFlow. It contains the product parameters and settings for the display, printer and the sensors.

- 👉 The Selection Menu is displayed after pressing <F3>.

Main Menu		
Selection:		
1	Display Config.	
2	Grand Totals	
3	Parameter List	
4	Service	
5	Logon	
6	Load monitor	
7		
8		
Up	Down	---
F1	F2	F3

4.1.3 Report Printouts (Key <Print>)

Each delivery is saved by the MultiFlow and can be printed out later as a report. This means that a complete shift or tour, with all events occurred, can be documented on a tour or trip report.

<Print>-Menu



In order to activate the print menu the <Print> key is pressed in the Start screen on the MultiFlow. With the report menu which is then displayed all the required reports can be selected and printed.

Reports	
Selection:	
1	Short Report
2	Detailed Report
3	Copy Receipt
4	Zero-Bill
5	Parameter List
6	Event Report
7	Office Link
8	(---)
9	(---)
0	Other
Up	Down
F1	F2
	F3

5 Initial Operation



Before you switch on the system for the first time, check the wiring to make sure that the connections are correct and firmly seated.

1. Then switch on the voltage.
2. Test the function of the solenoid valves (339) in the service menu (parameter **4.3.1**).
3. Test the functions of the temperature sensor and the pulse inputs in the service menu, too.
4. Check whether the correct pulse transmitter parameter has been set (parameter **3.3.1.4**).



The default parameter is a pulse transmitter with a THS switch output.



Test the printer connection by printing a zero receipt.



Once all these tests have been run successfully, you can start parameter setting of the MultiFlow.

The MultiFlow has an access check for sensitive parameter areas.

The following **passwords** are set by the manufacturer:

Password	Designation
99 99 99	Driver ID
65 43 21	Password
12 34 56	Seal password



The input of parameters and a description of the menu structure are detailed from chapter 9 "**Configuration of the MultiFlow**" / page 115 onwards.

5.1 Version Numbers

Version numbers, which are printed on the parameter lists and W & M receipts, are used to identify the current software version.



These numbers can be called up in menu 4.1.1.

The version number has the following format:

W & M Version	Service Version	Language Code
2.02	[2.00]	EN

Example of a version number

- The **calibration version** indicates which calibration-capable version is installed in the MultiFlow control unit. This is the calibration version number.
- The **service version** indicates the version status of the program section that is not relevant for calibration purposes. Calibration is not mandatory for this part of the program. Until now, you could only replace this in conjunction with the program section for which calibration was mandatory (*subsequent calibration required!*).
From MID Version 5.00 onwards, this section, i.e. the one not requiring calibration, can be replaced *without* making subsequent calibration necessary.
- The **version numbers** can occur in different combinations because, for example, calibration version 1.00 can also be used with service version 1.05 or possibly even 2.0 (reverse compatibility).



For approved version numbers, a unique test sum is defined that is then shown on parameter lists and calibration seals. The permitted test sums are notified in writing to the calibration authorities immediately after approval.

5.2 Reading in New Program Versions (Update)

After reading in a new program version a loss of log book entries and parameter settings may occur.



All reports not yet produced must be printed out before the system is updated to the new program version. This also applies to the saving of the delivery data on a chip card where this form of data interchange is used.



The current device settings should always be saved on a parameter chip card before a new program version is read in, so that they can be read in again after the program has been updated. See chapter 9.12.1 "**Saving the Parameters**" / page 169.



If the parameters from another device or from an older card are to be accepted, the following steps must be followed:



Restore the valid receipt counter reading. To do this, set the parameter **3.1.9** to the next receipt number to be used.

In addition, check and correct the following parameters if necessary:

Parameter	Designation	Explanation
3.1.1	Device number	See MultiFlow name plate
3.1.2	Meter designation	See name-plate of measuring system
3.3.1.1	pulse factor	Number of pulses per liter (see preliminary certificate and label the measurement system)
3.3.2.1	(Temperature) offset	With the same electronics see old parameter list, otherwise refer to the preliminary test certificate for the MultiFlow
3.5.nn.7.5	Meter factors	With the same measuring system see old parameter list, otherwise recalibration is required
3.6	Driver list	If divergent lists are used, see old driver list

5.2.1 Carrying Out a Program Update

With MultiFlow the reading in of a new program can be executed in two ways:

- By changing the EPROM chip. This process is described in detail in chapter 15.3 "**Software update by exchanging the EPROM chip**" / page 273.



For this operation you must open the housing.



The relevant Ex installation regulations must be taken into account.

- Transfer of the program via the printer line ("Download"). This process is described in detail in chapter 15.2 "**Software update by download**" / page 268.



To do this, a PC with a special service program is required. Opening the housing is *not* required.



This function is not available in program versions older than 1.5. You must set the printer interface manually to "RS232" and "9600Baud". It may also be necessary to separate other equipment from the printer line.



Explicit approval of the download is not available until program version 5.00.

5.2.1.1 MultiFlow up to version 5.00



The "Program update" menu item (**menu 4.6**) has been added to the "Service" section of the main menu to enable the program transfer via the printer line in the case of multiple measuring systems. This menu offers you the functions "Activated" (**menu 4.6.1**) and "Disabled" (**menu 4.6.2**).

- In the case of vehicles with several measuring systems these functions enable you to select the specific MultiFlow onto which a new program should be loaded.



Only the specific MultiFlow on which a program update is to be carried out may be set to "Activated"; all others must be "Blocked".



The status currently active is shown in the display (in double-size lettering). The update mode is terminated by pressing *any* key.



The manual supplied with the service program contains detailed instructions for reading in a new program version via the printer line. See chapter 15.2 "**Software update by download**" / page 268.

5.2.1.2 MultiFlow from version 5.00



The functions described below for the approval and management of program updates are available only in the MID MultiFlow variant (from version 5.00).

Program update menu




All software download attempts involving changes in the calibration-relevant


programming section - whether successful, faulty or called off – are saved in a special logbook for traceability purposes. The maximum number of admissible downloads is limited to 30, wherein only downloads with changes in the calibration-relevant program section are logged. Downloading a software


in which only changes in the non-calibration relevant program section have been carried out does not result in a reduction in the still available download attempts. No further downloads can be carried out should the maximum number be attained or the logbook damaged. In such an

Program update	
Selection:	46
1	Program update
2	Remain. attempts
3	Update report
4	Reset
Forward	Back ---
F1	F2 F3

instance, the download logbook must be reset via the "Reset" (**menu 4.6.4**) item. To this end, the electronic seal must be broken beforehand. The update report is automatically printed before the download logbook is reset. If this is not possible, then the reset cannot be carried out.

 The download is approved for the MultiFlow concerned via the "Program update" menu item (**menu 4.6.1**). It is necessary to select the "Activated" status for this purpose. The download is protected by the master password. The user must enter the correct password and his/her user ID before downloading can start. This is then saved together with the actual date and time in the logbook for the purpose of tracking the executed downloads. The download can be started on completion of all the required entries. No software can be transferred to MultiFlow without this download approval.

 The "Remain. attempts" menu item (**menu 4.6.2**) gives a quick indication of remaining available download attempts.

 A printout of the current update report can be generated using the "Update report" menu item (**menu 4.6.3**). This report contains general information and also the number of remaining available downloads attempts. The "*Update progress*" section contains a list of all software downloads started or executed so far along with date, time, status ('-' = incomplete download, '+' = complete download), checksum and user ID.

Update-Bericht

Serial number : 18UH0004
 Device number : 12
 Meter des. : HH-TS 1927
 Personnel no. : 000001

Report date : 06.12.2006 13:45
 Version : 5.00[5.00]DE
 Seal number : 005591

 Remain. attempts : 25

Update progress :

06.12.06/12:54 - 00000000 User ID
 06.12.06/12:56 + EC2F31E2 User ID
 06.12.06/13:08 + EC2F31E2 User ID
 06.12.06/13:30 - 00000000 User ID
 06.12.06/13:36 + EC2F31E2 User ID



Only the MultiFlow on which a program update is to be executed may be "Activated". All others must be "Disabled". (**menu 4.6.1**)



To ensure the maximum number of available downloads, the download logbook must be reset via **menu item 4.6.4** before activation of the W & M seal.



The currently active status is displayed (in double-sized font). Press *any* key to exit the update mode.



The manual supplied with the service program contains detailed instructions for loading a new program version via the printer line. See chapter 15.2 "**Software update by download**" / page 268.

5.3 Initialization



After updating the software to a new version e.g. by loading the program via the printer interface or by replacing the EPROM, the MultiFlow needs to be re-initialized.

This means that the complete factory settings are re-established under menu point **4 Initialization** in the Service menu. Only data permanently retained in the memory, such as the total sum readings or the serial number, remain unaffected by the initialization.



To avoid the time-consuming job of entering the parameters manually, you can simply load these into the MultiFlow from a chip card (see chapter 9.12 "**Saving Parameters on the Chip Card**" / page 168).

5.4 Chip Card Reader

The chip card reader is integrated into the upper part of the MultiFlow. Only the chip cards supplied by F. A. Sening should be used.



If chip cards from other suppliers are used, then faults in operation may occur.

The slot for the chip card is located behind the plastic flap on the side of the device where it is protected from contamination. In the latched state, the chip card reader conforms to IP65 class of protection.



To open, pull the latching lever forward and fold back the plastic flap.



Now the slot for the chip card is visible.



Insert the chip card with the contact pads face down (not visible on insertion).

- Close and latch the flap.



Only when the chip card is secured in this way no dampness can enter the device.



The plastic flap which protects the chip card reader must always be kept closed and latched. You should never drive the truck with an open or unlatched flap. The vehicle should never be left outdoors overnight with the flap unlatched.

In conjunction with a chip card the chip card reader is used to save the parameter list, and for data interchange with the data processing system (PC or similar) in the office. The backup copy of the parameter list can be used, for example, to reload the parameter list and the delivery receipt definitions into the MultiFlow after a program update.

The chip card can also be used to simplify the office work and to automate the processing of the customer data. The customer receives deliveries in the usual manner.

After the end of the shift the delivery data is no longer output as a daily report on the printer, but is instead written to the chip card. The chip card is read out in the office and the data can be processed with suitable software. A printout of the daily report on the vehicle is therefore no longer required.



Further information in chapter 9.12.1 **"Saving the Parameters"** / page 169.

5.5 Overview

With the Chip-Plus Package for the Sening® MultiFlow tank truck computer, it is possible to directly acquire and process computer data in

office applications using conventional memory cards. Commercially available hardware and software, in combination with a standard PC or laptop, is used for reading and writing these memory cards. The MultiFlow Chip-Plus Package is supported by several companies (further information available on request).

Overview of advantages:

- Cost-effective, quick connection to office EDP using commercially available components.
- Manual data collection is no longer required; errors resulting from manual input are avoided.
- Data are automatically sorted with the help of standard software. Handling of checks and delivery data is made substantially easier.
- The tank truck driver's burden is reduced because he does not have to make as many printouts.
- A running turnover and inventory control (daily reports) is easily provided for, as the data are available at all times.
- Invoicing is simplified, as all operating reports are immediately available at the end of the day. These no longer need to be manually entered and analyzed.
- The backup copy of the parameter list on the chip card can be used, e.g., to reload the parameter list and the delivery voucher definitions into the MultiFlow after a software update.

Information that is transferred:

All daily voucher information, e.g.

- Voucher number
- Customer number
- Product code
- Volume, VT and V15
- Mass
- Average product temperature
- Start and end of the delivery (date/time)
- Invoice issuing / Type of voucher
- Pricing information

5.6 Installation

1. Windows 2000 or Windows XP must be installed, with EXCEL 2000 or EXCEL 2003.

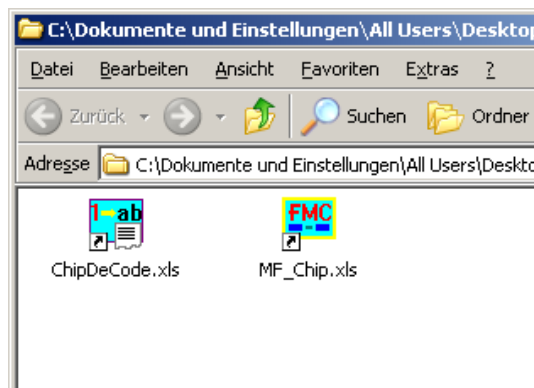
2. The CHIP-card hardware and software (drivers) must be installed according to the manufacturer's instructions. Using the diagnostic program in the Windows system manager, access to the chip card must be accomplished without error messages.
3. Now place the MF-Chip installation CD in the drive.
The program will start automatically.



4. Please follow the installation instructions.
5. After a successful installation, the following folder will appear on your desktop.



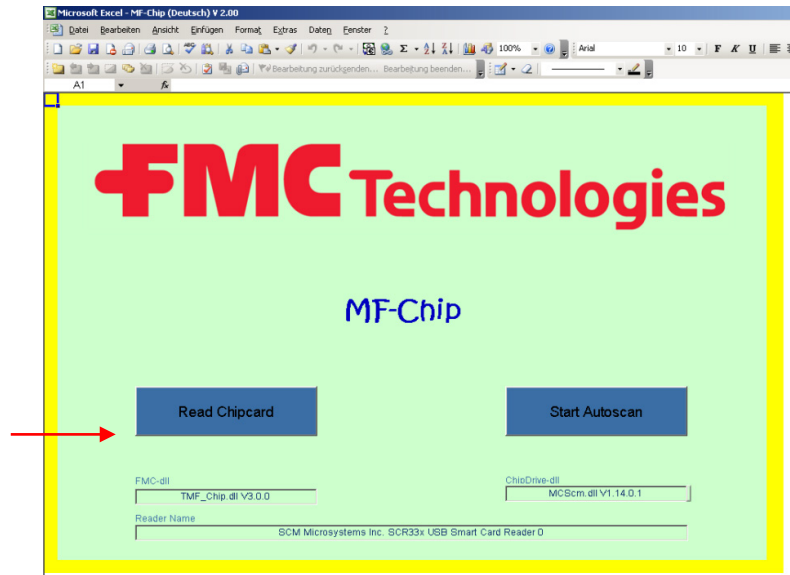
6. This folder contains 2 Excel files.



7. In the file <ChipDeCode.xls>, the numerical codes for Device No., Operator No., Match Code and Product Code pre-inserted by the Multiflow on the chip card may be replaced by character strings in the correspondingly-named tab. The user must once adjust these in accordance with the individual indications in column B, corresponding to the numerical codes in column A. If no matching

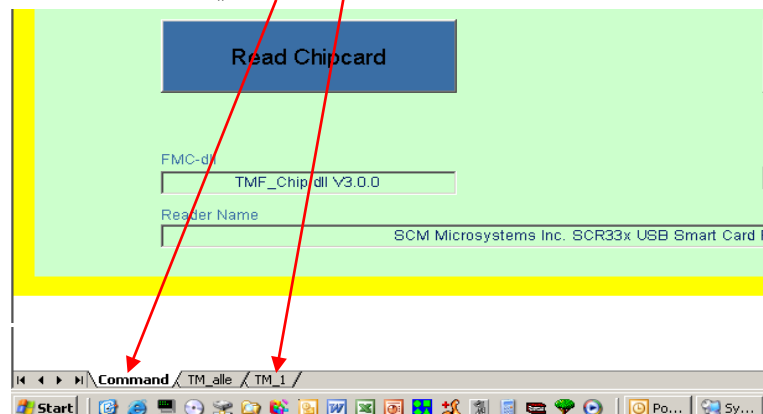
numerical codes are found in column A, the numerical codes are displayed.

8. Execution of the program takes place by invoking MF-Chip.xls.



9. Now insert the chip card with the four data in the card reader and click on „**Read Chipcard**“ at the lower left.

10. Now please select tab **TM_1**.
Do not delete the „**Command**“ tab.



11. The tour data is now available in Excel format for further processing.

Note:

- The <Start Autoscan> button allows the inserted chip card to be read automatically.
- The application as a whole is based on various VBA macros. Execution of these macros must therefore be enabled. This can be set in the *Extras* Excel menu under *macro/security* by setting security level *Medium* or *Low*. With the *Medium* setting, the activation of macros must be re-authorized every time they are invoked.

5.7 Diagnosis

Although during the MultiFlow development consideration has been given to ensure a low degree of effort in installation, faults may still occur during initial operation.

When a fault occurs, the MultiFlow supports error analysis with diagnostic functions and thus increases easy installation of the device.

The diagnostic functions mainly involve peripheral devices:


- Temperature sensor, pulse sensor, inputs and outputs
- Printer
- CAN Bus
- Remote control
- Multi/IO
- EPE2
- IO-Interface
- Sensor-Interface


5.7.1 Inputs and Outputs


In **Menu 4.3.1** the diagnostic functions for the inputs and outputs, including temperature and pulse sensors are summarized.


Diagnosis Menu 4.3.1

In-/Outputs						
Outputs →	Outputs					
	1	2	3	4	5	6 7
	0	0	0	0	0	0 0
Inputs →	Inputs				Pulses	
	1	2	3	4	A	B PT
	0	0	0	0	0	0 1
Present temperature →	+12,34 C					
Status →	A:xxxxxx ---B:xxxxxx					
System messages →	Testing ...					
	Selftest					OK
	Seal					OK
	Version3.30 [3.30]GB					
	State		Count		Add	
	F1		F2		F3	

 The status of the **pulse inputs A** and **B** must continually change between '0' and '1' when the pulse transmitter rotates. In contrast, the input **PT** must always be at '1' because '0' indicates a fault (no sensor connected).

 The **temperature display** continually indicates the currently measured temperature. It can be used for checking the temperature recording device.

 A further option for checking pulse inputs can be activated by pressing **<F2>**. Now the display no longer shows the current conditions of pulse inputs A and B, but the number of pulses counted in each case. The display can be changed back via **<F1>** to show the current conditions of pulse inputs.

 To check the correct functioning of the additive pump, a trial lift can be carried out via **<F3>**. This test also includes monitoring stocks, piston limit and resting position and the cycle time. During the trial lift details on the number of lifts run through and the total quantity of additive discharged are displayed. The details refer in each case to the current test. If the test-point is left and then called up again, the numbering starts at 0.

Diagnosis Menu 4.3.1

In-/Outputs						
Outputs						
1	2	3	4	5	6	7
0	0	0	0	0	0	0
Inputs				Pulses		
1	2	3	4	A	B	PT
0	0	0	0	0	0	1
+12,34 C						
A:xxxxxx ---B:xxxxxx						
Testing ...						
ADD-Test Start						
ADD-Test #3 150.00ml						
ADD-Test End						
State		Count		Add		
F1		F2		F3		



A temperature display outside the $\pm 200^{\circ}\text{C}$ range points to a cable fracture, short circuit or missing sensor. Please check the wiring of the sensor.

The seven **outputs** can be switched (provided the MultiFlow has not been sealed) by pressing the corresponding number (1-7). That way a functional test of the connected device (solenoid valve 339) is possible.



For safety reasons all outputs are set to '0' (inactive) on calling up and on leaving the diagnostic screen.



The assignment of the outputs to functions depends on the selection of the valve control. Please refer to **parameter 3.1.8.1** and the respective circuit diagrams.



The current status of the valves must be observed without fail.
When a vehicle is operational actuation of the valves can lead to escape of the product!

The following assignments are normal (further options in chapter 9.3.1.8 "Valve Control" / page 141):

	1 Basic Control	2 Flow Control	3 Fully Electronic Control	4 Expanded Electronic Control	5 With blow down	6 Exp. electron. BE
Output 1	Control air	LOW Flow	Wet hose	Wet hose LOW flow	Wet hose LOW flow	Wet hose LOW flow
Output 2	Interlock	HIGH Flow	Dry hose	Dry hose LOW flow	Dry hose LOW flow	Dry hose LOW flow
Output 3	ADD pump	Release control switch	ADD pump	Wet hose HIGH flow	Wet hose HIGH flow	Wet hose HIGH flow
Output 4	-----	ADD pump	Bypass	Dry hose HIGH flow	Dry hose HIGH flow	Dry hose HIGH flow
Output 5	-----	-----	Position 1 Dual hose outlet nozzle	Position 1 Dual hose outlet nozzle	ADD pump	Position 1 Dual hose outlet nozzle
Output 6	-----	-----	Position 2 Dual hose outlet nozzle	Position 2 Dual hose outlet nozzle	-----	Position 2 Dual hose outlet nozzle
Output 7	-----	-----	Unmeasured	Unmeasured	Blow down	ADD pump
Output 8	-----	-----	-----	-----	-----	-----
Output 9	-----	-----	-----	-----	-----	-----
Output 10	-----	-----	-----	-----	-----	-----
Output 11	-----	-----	-----	-----	-----	-----
Input 1	ADD pump rest position	ADD pump rest position	ADD pump rest position	-----	ADD pump rest position	ADD pump rest position
Input 2	ADD pump end position	ADD pump end position	ADD pump end position	-----	ADD pump end position	ADD pump end position
Input 3	ADD pump filling level	ADD pump filling level	ADD pump filling level	-----	ADD pump filling level	ADD pump filling level
Input 4	Overfill prevention amplifier	Overfill prevention amplifier	Overfill prevention amplifier	Overfill prevention amplifier	Product Transfer & Self Loading	Overfill prevention amplifier
Input 5	-----	-----	-----	-----	-----	-----
Input 6	-----	-----	-----	-----	-----	-----
Input 7	-----	-----	-----	-----	-----	-----
Input 8	-----	-----	-----	-----	-----	-----



Output 1.. 7: MultiFlow
Output 8..11: MFIO-E

Input 1..4: MultiFlow
Input 5..8: MFIO-E

5.7.2 Printer

The diagnostic functions for the printer are shown in **Menu 4.3.2**.

Menu 4.3.2

Selected printer →	Printer (295)
Settings →	Port : RS232 Baud Rate : 9600 Parity : None
Check Text →	Send
Echo →	F.A. Sening Receive F.A. Sening OK!
Status →	Ready
System messages →	Selftest OK Seal OK Version 3.04 [3.10] GB --- --- ---
	F1 F2 F3

The display shown above gives a quick summary of the printer settings currently selected:

- Selected printer (in the header)
- Type of interface (RS-232 or RS-485)
- Transmission speed (baud rate)
- Parity monitoring (even, odd or none)

When printer faults occur, the MultiFlow offers the possibility of executing a so-called "loop-back test". This test enables the printer connection to be tested for lead breakage (see chapter 5.7.2.1 "Loop-Back Test" / page 59).



5.7.2.1 Loop-Back Test





A so-called "loop-back test" is available to check the wiring. This test can be executed with any printer linked.



Remove the data cable from the printer and bridge the communications lines.

- Bridge the following pins:

RS-232 (Printers DR-295, DR-298 & Tally printer)	
Pin	
2	TX 
3	RX 

RS-485 (Tally printer)	
Pin	
9	TX- 
16	RX- 
10	TX+ 
18	RX+ 



Press the <F1> key to execute the so-called "loop-back test".



During the line test the text in the status line changes from "Ready" to "Test running ...".



It is important to set the jumpers in the plug on the end of the data cable to ensure the complete wiring is tested.

To localize a possible fault, the test section can be shortened (terminals).

Menu 4.3.2

Selected printer →	Printer (295)
Settings →	Port : RS232 Baud Rate : 9600 Parity : None
Check Text →	Send F.A. Sening
Echo →	Receive F.A. Sening OK!
Status →	Ready
System messages →	Selftest OK Seal OK Version 3.04 [3.10] GB --- --- ---
	F1 F2 F3

As shown in the illustration above, the check text and the echo must be identical. If this is not the case, then a fault has occurred. Normally, the fault is caused by missing wiring or a line breakage.



If the test is positive (line OK) but the **printer still does not print**, then crossed wiring may be the problem with the Send (TX) and Receive (RX) lines crossed.

5.7.3 CAN Bus

The diagnostic functions for the CAN Bus are shown in **menu 4.3.3**.

Menu 4.3.3

Communication status →
of linked devices .

Globaler CAN-Bus								
No .			No .			No .		
0	??		1	**		2	OK	
3	--		4	--		5	--	
6	--		7	--		8	--	
9	--		10	--		11	--	
12	--		13	--		14	--	
15	--		16	--		17	--	
18	--		19	--		20	--	
21	--		22	--		23	--	
24	--		25	--		26	--	
27	--		28	--		29	--	
30	--		31	--				
New			---			---		
F1			F2			F3		

The display shown above gives a quick summary of the actual status of the CAN Bus links.

The following conditions are possible:

Display	Condition
--	Status unknown
OK	Link in order
??	Link interference, no communication possible
**	Node reference of operating device

5.7.3.1 Testing Links

By pressing key <F1> a general request (broadcast) will be sent to all nodes (devices). This request is to be answered within a few seconds. Thus with this test function the linking status can be brought up to date.



While testing the links internal timeouts will occur, so the display will need up to 10 sec. for complete updating. Please do not activate this function twice within this time frame (10 sec).

5.7.4 Remote control

The diagnostic functions for remote control are located in **menu 4.3.4**. In the event of faults occurring, however, a check should also be made in the CAN bus diagnostics (see above) as to whether the base station is recognized.

The remote control diagnostics screen firstly shows the following image:

Menu 4.3.4, ready

Remote Control	
Status of the overfill prevention →	Level Probe | -
Status of the dead man's switch →	(No, N:0, 1.8s ) | -
Last incoming telegrams → Of the various types .	SGN: KEY: STS: (Idle)
Pre-set amount for test of → The remote control .	Ready Amount : 1000
	Link Start Discon.
	F1 F2 F3

The details in brackets concerning the functions “Level probe” and “Dead man’s switch” have the following meaning (see **parameter 3.1.6.n** and **3.1.8.8**):

- „YES“ The function is activated. If the function is not being used the entry reads “No”.
- „N:0“ Defines the node number (address) of the base station that is providing the function in question
- „1.8s“ Defines the interval at which the base station must cyclically provide a status value (heartbeat), or else the MultiFlow changes to an error status.



The functions “Level Probe”, “Dead man’s switch”, and the remote operation of the MultiFlow can be implemented via various base stations. As a rule, however, only one base station is used, and this has the node number “0”.

5.7.4.1 Check function



The “Idle” comment in brackets indicates that the readiness mode of the MultiFlow has just been activated. To check the functions of the remote control, a connection must first be made with one or several base stations. This is achieved by pressing <F1>.



After the connection to the base station has been established, the display in the handheld remote control is changed, as well as the status display of the overfill prevention and the dead man switch.




Menu 4.3.4, connected

Status of the overfill prevention →

Status of the dead man's switch →

Last incoming telegrams →
Of the various types →Preset amount for test of →
the remote control

Remote Control	
Level Probe	█ T -
(YES, N:0, 1.8s)	
Deadman Switch	█ +
(YES, N:0, 1.8s)	
SGN: CST	
KEY: +	
STS: LNK	
(Preset)	
Testing	
Amount: 1100	
Link	Start Discon.
F1	F2 F3

-  In the first instance a small rectangle will jump repeatedly from left to right. This symbolizes the “heartbeat” of the sensor. The changeover takes place approximately twice per second. However, should the interval become larger than the set maximum value, a connection fault may have occurred and a “T” (for time out) appears behind the rectangle. In addition the sensor status changes from “+” (for OK) to “-” (for fault).
-  When the connection has been activated the MultiFlow simulates the “preset” operating state. This enables the setting of a preset value via the remote control (see also chapter 6.7 “**Discharge operated remotely**” / page 82 and the MultiControl user manual). The alteration of the preset value is displayed in the lower third of the display.
-  By pressing the key <F2> the MultiFlow changes to the “discharge” operating state. This can similarly be checked on the remote operation display.

Menu 4.3.4, discharge

Status of the overfill prevention →

Status of the dead man's switch →

Last incoming telegrams →
of the various types →Pre-set amount for test of →
the remote control

Remote Control	
Level Probe	█ +
(YES, N:0, 1.8s)	
Deadman Switch	█ +
(YES, N:0, 1.8s)	
SGN: REL	
KEY: Flow	
STS: LNK	
(Drop)	
Testing	
Amount: 1500	
Link	Start Discon
F1	F2 F3



The connection is broken using <F3> and the MultiFlow is in the state described at the beginning (idle).


5.7.4.2**Message meanings**


KEY	Meaning
Start	Start / resumption of a discharge
Stop	End of a discharge
Volume	Change to a volume display during a discharge
Flow	Change to a flow display during a discharge
+	Increase pre-set value by 100
-	Reduce pre-set value by 100
++	Increase pre-set value by 1000 (SHIFT +)
--	Reduce pre-set value by 1000 (SHIFT -)
SHIFT	Shift key has been pressed
PULSE	Dead man's key has been pressed
&PULSE	Shift key and dead man's key have been pressed simultaneously
&NOTSTOP	Shift key and emergency off key have been pressed simultaneously
&Start	Shift key and start key have been pressed simultaneously (motor start)
&Stop	Shift key and stop key have been pressed simultaneously (motor stop)
&Vol	Shift key and volume key have been pressed simultaneously
&Flow	Shift key and flow key have been pressed simultaneously

SGN	Meaning
NCN	Overfill sensor not connected
HEA	Overfill sensor heated
CHK	Overfill sensor checked
REL	Overfill sensor released
SHR	Overfill sensor short circuit
COV	Overfill sensor covered, tank full
CST	Overfill sensor disconnected, no connection to the unit
DeadMan+	Dead man's switch released
DeadMan-	Dead man's switch blocking, i.e. time has run out or no connection

STS	Meaning
LNK	Connection to base station established
NOLNK	Connection to base station could not be established, possibly blocked by a different device

5.7.5 EPE2

 The following description is relevant only for program versions 5.00 and higher (approval according to MID).

 The connection to the EPE2 is interrupted during the data transfer between the MultiFlow and the chip card and is automatically restored at the end.

The EPE2 diagnostic functions are compiled in **menu 4.3.6**.

Menu 4.3.6 EPE2

Control options →

Current status →

EPE2		
1	2	3
Link	Output	Link
ON	change	OFF
Link	Output	Input
1	0	H
Testing		
Link	Start	Discon.
F1	F2	F3

- ☐ The EPE2 is connected to the MultiFlow's external CAN bus. A connection to the EPE2 via the CAN bus is required in order to control the EPE2. This connection can be established for test purposes using key 1 and/or broken using key 3.
- ☐ The EPE2 has one output. The status of this output can be changed during the test using key 2. The EPE2 also has one further input.
- ☐ Current statuses (connection, input and output) are shown in the central section of the display.

5.7.6 IO Interface

Menu 4.3.7 contains the diagnostic functions for the IO interface (8 outputs, 2 inputs). It gives an overview of the current statuses of the inputs and outputs of the external interface module.

This menu item can be accessed only when the connection to the IO interface is active.

Diagnosis Menu 4.3.7

IO-Interface				
Outputs →	Outp. 1	2	3	4
	0	0	0	0
	Outp. 5	6	7	8
	0	0	0	0
Inputs →	-----			
	Input 1	2		
	0	0		
Status →	Testing ...			
System messages →	IO online			
	IO Test-Start			
	---	---	---	
	F1	F2	F3	

- ☐ The eight **outputs** can be switched by pressing the corresponding number (1-8). In the case of outputs allocated to a hose path in the configuration of the IO interface, this is possible only when the electronic seal is broken.
- ☞ The <F3> button queries the version number of the IO interface.



The diagnostic function can be used only when the connection to the IO interface is active.



On exiting the diagnostic screen, the IO interface is re-initialized according to the specified configuration.



It is essential that the functions of each output are noted.

5.7.7 Sensor interface

The diagnostic function for the sensor interface is contained in **menu 4.3.8**. For every sensor input used, the corresponding sensor status is displayed. The statuses of the sensor inputs not used in the configuration are indicated with '-'.

This menu item can be actuated only when the connection to the sensor interface is active.

Diagnosis Menu 4.3.8

Status of the →
used sensor inputs

Sensor interface					
No.	Input				No.
		No.			
1	0	2	1	3	-
4	-	5	-	6	-
7	-	8	-	9	-
10	1	11	-	12	-
13	-	14	-	15	-
16	-	17	-	18	-
19	-	20	0		
Test is running ...					
SI connected					
SI online					
New --- ---					
F1		F2		F3	

Possible statuses:

0 - open, 1- closed, 2 - interrupted, 3 - short-circuited



Press the **<F1>** key to initiate an update of the overall status display. Under normal circumstances this is not necessary however because all statuses are updated automatically as soon as they have been detected by the MultiFlow. There is a short delay between the change in status and the display updating due to the internal evaluation logic.



With the button **<F3>** the version number of the sensor interface will be queried.



The diagnosis function can be used only when the connection to the sensor interface is active.



There is a short delay between the change in status and the display updating due to the internal evaluation logic.



The states transmitted from the sensor interface are shown independent of the NC / NO logic configured in the Multiflow.

6 Discharge

Usually the discharge of product proceeds as follows:

1. Switch on the MultiFlow
2. Start discharge
3. Select product (or accept preset)
4. Select discharge path (*)
5. Discharge
6. Terminate discharge (and/or deliver additive)
7. Print delivery note or bill

Single steps can be enabled / disabled by changing the setup.

^{*)} **optional:**

In versions lower than 3.10 the discharge path is selected prior to the product, in versions lower than 2.0 selection of the discharge path is not included.

6.1 Carrying Out a Discharge (Part 1)

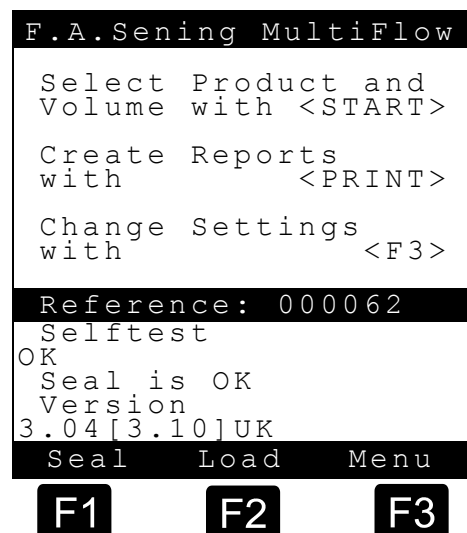
After being switched on, the MultiFlow runs a self-test after which it is ready for discharge.

Start screen



Step 1:

Press the <Start> key.



6.2 Carrying Out a Discharge (Part 2)

- ☺ Now the delivery preset screen appears.

The preset screen displays the last selected product. If another than the displayed product is required, you now enter the desired product code (see chapter 6.2 "Carrying Out a Discharge (Part 2)" / page 70).

Delivery Preset	

Prod. Code:	>11<
	Heating Oil
Amount :	1000000 ℓ
Price per	100 ℓ
w. VAT	£ 87,65

Wet hose	
Continue with ENTER	
PNo :	11
--- Clear ---	
F1	F2
	F3

- ☹ If the displayed values are not correct, or if another than the displayed product is required, advance to section "Selecting a New Product".
- ☺ If all displayed data is correct, continue with Part 3 of the discharging operation (chapter 6.5 "Carrying Out a Discharge (Part 3)" / page 77).

6.2.1 Selecting a New Product

Specifying the product to be discharged

To choose a new product you can enter the product code. The product will then be displayed automatically. If you enter an invalid product code, you can choose the desired product from the product pages.

- ☞ Enter the desired product code.
- ☹ If the product code is not known, an invalid product code (e.g. "99" or "00") can be entered.
- ☺ A selection list of all products then appears automatically.
- ☞ Select a product page.
- ☺ A suggestion list with all products is displayed.
- ☞ Select the desired product.
- ☞ The selection can either be accepted into the discharge settings with the function keys <F1> or <F2> (Cursor Up / Down) and then <Enter> or by pressing the number in front of the product.



Once the desired code is entered, the preset discharge quantity and default price are displayed marked by pointed brackets (> XX <). By pressing the <Enter>-key you can confirm these settings. For verification the input value is displayed in double size characters at the bottom of the display area (underneath the status line). With the numerical keys you can change these entries. The <Enter>-key confirms the input and switches to the next input field.

6.3 Measuring system residue removal (optional)

Now you have selected the desired product. Continue with part 3 of the discharging operation (chapter 6.5 "Carrying Out a Discharge (Part 3)" / page 77).



Step 2: Press the <Start> key.

When using the "device for emptying and refilling the measuring system" according to Authorization 5.162 / 01.01 the operator is asked during a product change whether the necessary emptying/refilling has been carried out.

If this is answered with 'YES' a corresponding entry is written into the logbook and the delivery dialog – start of delivery is continued. If answered with 'NO' then a message appears with the request to carry out the residue removal / refilling and a corresponding entry is made in the logbook.

6.3.1 MultiFlow up to version 5.00

The measuring system residue removal message can be switched on and off with parameter **3.1.8.5.1**. In addition parameter **3.1.8.5.2** has already been implemented which in a future version will activate the printing out of a document concerning successful residue removal.

If parameter **3.1.8.5.1** (residue removal control) is set to 1, this causes the following new operating sequence:

1. After entering all the preset values and pressing the **<START>** key again, the MultiFlow checks whether a product change has taken place between diesel and heating oil / heating oil with additives. If this has happened a corresponding message is shown about the necessary residue removal:

Discharge pre-set		

Produkt-No:	>11<	
Amount	EL heating oil	
	: 1000000	ℓ
Price per	100	ℓ
with VAT	€ 87,65	
Product change !		
Has residue removal been carried out?		
PNo :	11	
Yes	No	---
F1	F2	F3

2. If residue removal has not been carried out the driver must press the **<F2>** key. A corresponding entry is then made in the logbook and the display shows the following information:

Please carry out residue removal		
---	---	---
F1	F2	F3

- The MultiFlow remains in this operating state until it is switched off, i.e. it will not react to key entries (e.g. **<START>**, **<STOP>** etc.).

3. After carrying out the residue removal operation (for this period the MultiFlow is switched off by the residue removal controller) the MultiFlow starts up again and the driver must repeat the discharge pre-set entries. The query as to whether residue removal has been carried out is this time confirmed by pressing the **<F1>** key. The confirmation is saved in the logbook.

After carrying out residue removal you should continue with the 4th part of the discharge procedure (see chapter 6.4 "**Electronic hose selection (optional)**") / page 76).

6.3.2 MultiFlow from version 5.00



The following description is relevant only for program versions 5.00 and higher (approval according to MID).

The measuring system residue removal message can be switched on and off with parameter **3.1.8.5.1**.

Control resid.		
Selection: 31851		
1	Off	
2	Stand-alone	
3	EPE2-Manual	
4	EPE2-AIII	
5	EPE2-AI	
Forward	Back	---
F1	F2	F3

If parameter **3.1.8.5.1** (residue removal control) is set to 2, this causes the following new operating sequence:

- After entering all the preset values and pressing the **<START>** key again, the MultiFlow checks whether a product change has taken place between diesel and heating oil / heating oil with additives. If this has happened a corresponding message is shown about the necessary residue removal:

Delivery pre-set		

Product no:	>11<	
Amount :	EL heating oil	
	1000000 l	
Price per	100 l	
with VAT	€ 87,65	
Product change !		
Has residue removal been carried out?		
PNö :	11	
Yes	No	---
F1	F2	F3

- If residue removal has not been carried out the driver must press the **<F2>** key. A corresponding entry is then made in the logbook and the display shows the following information:

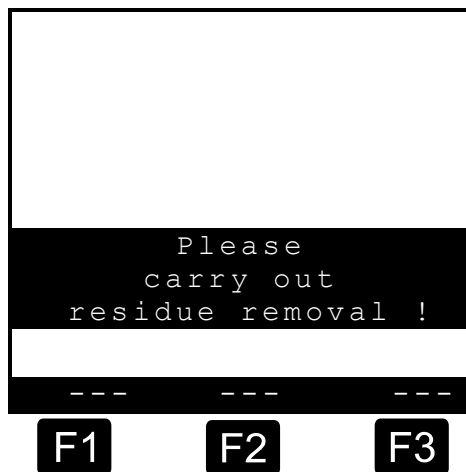


The MultiFlow remains in this operating state until it is switched off, i.e. it will not react to key entries (e.g. **<START>**, **<STOP>** etc.).

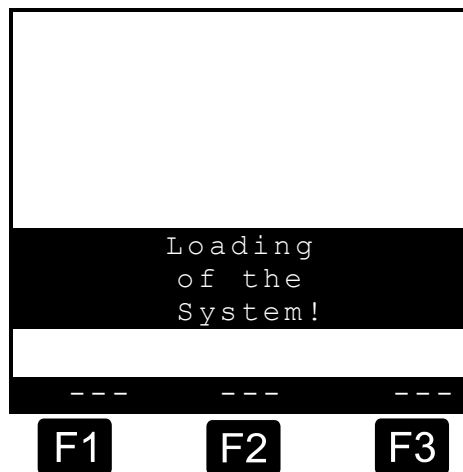
Please carry out residue removal !		
Autom.	---	---
F1	F2	F3

3. After carrying out the residue removal operation (for this period the MultiFlow is switched off by the residue removal controller) the MultiFlow starts up again and the driver must repeat the discharge pre-set entries. The query as to whether residue removal has been carried out is this time confirmed by pressing the <F1> key. The confirmation is saved in the logbook.

- ☐ If parameter **3.1.8.5.1** (residue removal control) is set to **3** and/or **4** the wet leg sensor connected to the EPE2 is continuously monitored to check whether residue removal has been carried out on the measuring system (complete discharge and refilling). If residue removal is detected, this is recorded in the MultiFlow logbook. If residue discharge has been detected, the residue removal message is not displayed when switching between diesel and heating oil / heating oil with additives. If residue removal has not been detected, the corresponding message is displayed. Delivery in this case is not started until the measuring system has undergone residue removal. The MultiFlow does not need to be restarted in this case.
- ☐ If a drop in the fill condition sensor of the measurement system is signaled to the MultiFlow during the residue removal request by the EPE2, the driver is instructed that the measurement system is to be filled.
- ☐ The MultiFlow does not need to be re-started if residue removal is controlled via EPE2.



Display "Residue removal request, system filled"



Display "Residue removal request, system not filled"

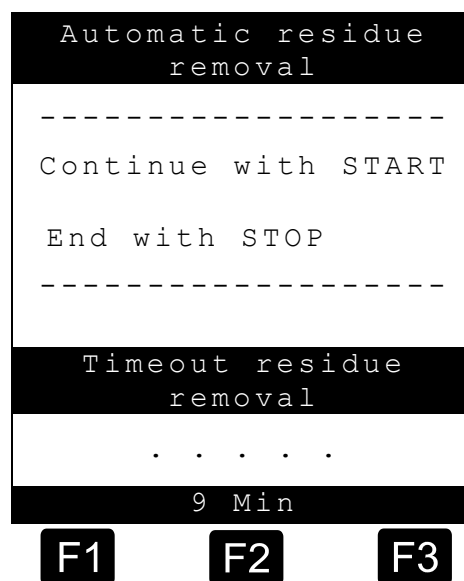
- ☐ If parameter **3.1.8.5.1** is set to **4** (EPE2-automatic) or **5** (EPE2-A1-Auto) it is also possible to control the residue removal from the measuring system from the MultiFlow using a residue removal pump. A suitable pump must be connected to the EPE2 output for this purpose. The "Autom. residue

removal" menu item (**menu 8**) can be used for removal of residue from the measuring system. It is controlled in accordance with the maximum operating time (parameter **3.1.8.5.2**), with the **<START>** and **<STOP>** keys.

- ☐ If the EPE2 detects that a product change cycle has not been completed after a product change, the driver also has the option in these residue removal modes to call up the menu point "Automatic residue removal" directly from the residue removal request before actual discharge. Pressing the **<F1>** key in the residue removal request will call up the menu point "Automatic residue removal", via which the output from EPE2 can be controlled.
- ☐ If you choose "EPE2 AI" in the menu "Residue removal via EPE2" (**menu 8**), the state of the EPE2 sensor is also being monitored during residue removal.
- ☐ If a complete residue removal cycle has been detected, the EPE2 outputs are deactivated and the residue removal will be paused.



Display "Residue removal request"



Display "Automatic residue removal"

- ☐ The options for control and operating sequences when using EPE2-AIII (4) and EPE2-AI (5) are mostly identical. If parameter **3.1.8.5.1** is set to 5 (EPE2-AI), the user is instructed, after completing the residue removal and fill procedure, also to observe the prescribed "minimum discharge quantities after residue removal". The acknowledgment of this instruction is recorded in the events log book. If an EPE2-AI is used, it is also possible to remove residues during product change between AI- and AIII-products.



If a product change is being implemented between **AI and AIII products**, it is essential that national regulations and operator guidelines are observed.



After correct residue removal from the measurement system, a residual quantity of residue is present in the measurement system (without pipe). Details of this residual quantity are given in the relevant measurement system documentation.



If an EPE2-AI is used, the input signal from the EPE2 must be inverted via parameter **3.1.6.8.4**.



After carrying out residue removal, continue with part 4 of the discharge (see chapter 6.4 "**Electronic hose selection (optional)**" / page 76).

6.4 Electronic hose selection (optional)



The automatic hose selection is an option only included in software version 2.0 or higher. This option is configured in parameter **3.1.8.1** (see chapter 9.3.1.8.1 "**Notes on the manual control of the hoses**" / page 143).



In software versions lower than 3.10 the electronic hose selection will be carried out before product selection.



For devices with manual hose selection you can skip this chapter.

Default: last selection →

Hose Selection

Selection:

- 1 Unmetered
- 2 **Wet Hose 1**
- 3 (Wet Hose 2)
- 4 Dry Hose
- 5 Bypass 1
- 6 (Bypass 2)

Up
Down

F1

F2

F3



The automatic hose selection replaces manually operated pneumatic switches. You are thereby able not only to select product and preset volume but also the discharge pass directly at the MultiFlow.

- ☺ After you have pressed the <Start> key, the defined / allowed discharge passes will be displayed first:
- ☞ Select the discharge pass by pressing <F1> or <F2> and press the <Enter> key to confirm your selection.
- 👁 You can also select the discharge pass by entering the corresponding number.
- ☒ If only a single position is transferred, this is automatically selected with no intervention by the operator required (from program version 3.00 and higher)

6.5 Carrying Out a Discharge (Part 3)

- ☞ **Step 3:** Press the <Start> key.

- ☺ The discharging operation is started. The delivery screen is displayed.

- ☺ Delivery is started.

- 👁 In combination with a GPS enabled EMIS the current GPS coordinates are determined at the beginning of the discharge and stored in the logbook. These can later be printed in the event report.

Delivery		
Heating		
Preset:	5500	L

		150
Compensated		
to 15°C		

Remain	7:40	min
Average	+15,8	°C
VT	32.0	1
V15	32.5	1

>>		
<div style="display: flex; justify-content: space-around; margin-top: 10px;"> F1 F2 F3 </div>		

F3

The preset quantity, compensation mode, product and discharged amount (in double size characters) are displayed on the screen. By pressing the **<F3>** key you can switch between different displays. The following displays are available:

```

Akt. Temp.:  +13.7 °C
w. VAT.      67.45 £
ℓ/min       703
---  ---  >>

```

```

Average      +11.2 °C
VT           548,4 ℓ
V15          555,1 ℓ
---  ---  >>

```

The third page shows the values for the additive dispensing. The display includes the name of the additive used, the discharged amount and the mixing ratio.

```

Add. Burny
Volume:      250 m ℓ
Ratio:       1 / 2000
---  ---  >>

```

```

10:22 Delivery start
10.47 Delivery end
Printout finished
---  ---  >>

```

A fourth page provides general information about the last three actions carried out.

Stop
or
preset
amount
reached

You can interrupt the discharge with **<Stop>**. To continue the discharge press the **<Start>** key, or press the **<Stop>** key a second time to irrevocably terminate the discharge. However, if the preset amount has been reached, then the MultiFlow automatically interrupts discharge and "Resume discharge?" appears in the display.

F1

If the discharge is to be continued (press **<F1>** for "Yes"), then the additional amount to be discharged must be entered.

The discharge is continued with **<Start>** after entering the amount. The entered amount is added to the amount already discharged, the total is now displayed as preset amount.

F2

If you want to discontinue discharging, press the function key **<F2>** for "No".

Stop

When the preset amount has been reached or the discharge terminated with **<Stop>**, other products (no metered products in Germany) can be added to the delivery after pressing **<Stop>** again.





Step 4: Press the **<Stop>** key.

F1

The query "More products?" is answered with the function key **<F1>** for "Yes".

Then the entry mask with the product code and the price is displayed. Enter the amount. You can also change to a packed good (additive), and the price can be changed.



-  With the key <Start> the product is accepted in the MultiFlow as delivered, similar to the liquid discharge.
-  The entry is terminated with the function key <F2> for "No" = no further products.


 **Step 5:** Press the <F2> key.


 **Discharge is terminated.**


6.6 Printing Delivery Notes and Invoices


Now you can print a delivery note or a complete invoice.


-  Select **Invoice** (<F1>) or **Delivery Note** (<F2>)
-  Depending on the setting of parameter 3.1.4.0.1 printing of an invoice can be excluded. In this case a delivery note is printed automatically.


-  When "Invoice" (<F1>) is selected, you have the option between private customers "Domestic" (including VAT) and commercial customers "Non-Domestic" (excluding VAT).

-  Confirm your entry with <Enter>.


-  One after the other the delivered products are now displayed, so that you can either confirm or correct the product prices attributed.

-  Confirm each correction with <Enter>.

-  Then the next possible input is selected (e.g. Customer No.) and marked by pointed brackets (>...<).

-  If you have made an input mistake you can overwrite the faulty value by entering a new value, or you can delete the character to the left of the cursor by pressing <F2> ('Clear').

-  When all entries are correct,

-  Press the <Print> key.

Delivery Confirmation	
Customer no:	000000

Heating Oil	
	110 ℓ
Price per	100 L
w.VAT	£ >45,67 <

Confirm with PRINT	
£	45,67
--- Clear ---	
F1	F2
F3	

☺ Then the next product (if registered) is displayed for confirmation. After confirming the last product and pressing the <Print> key an invoice is printed out.

✕ According to the settings of Parameter **3.1.4.5.6**, after the invoice has been printed a query about the customer's mode of payment is displayed.

✕ After printing the note and entering the payment mode the MultiFlow is ready for the next discharge.

🔗 All delivery data as well as the payment mode is entered to the logbook.

☺ Now the discharge is completed.

🔗 Depending on the setting of Parameter **3.1.4.2**, the display of the latest amount or product delivered is turned off immediately or after a pre-selected number of minutes. At factory this parameter is set to a default of 15 min. When this time has elapsed the Start screen is displayed once more.

Payment Mode	
Selection:	
1	No Payment
2	Cash
3	Cheque
4	Credit Card
5	Dir. Debt. Mandate
Up	Down
F1	F2
	F3

6.6.1 Using the Printer



As standard the MultiFlow comes equipped with the printer DR-295 or DR-298 FDW respectively, whose operating instructions are described in the following. If a different printer is used, please use the respective operating manual.

👉 Turn on the printer using the power switch on its left side.

☹ Only the latest printer models have this switch.

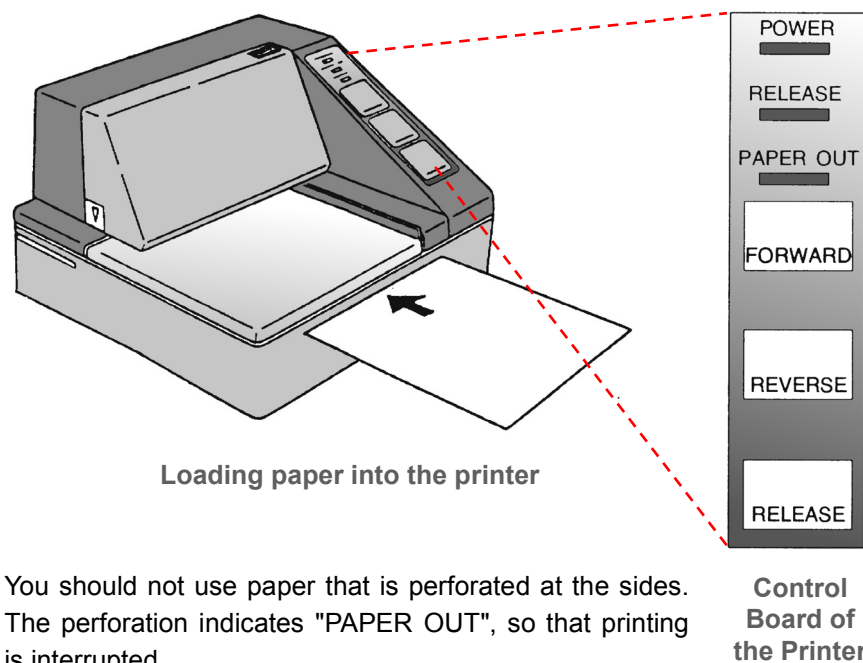
☺ The printer is ready for printing when the **POWER** light is on.

🔗 Paper can be inserted only when both the **POWER OUT** and **RELEASE** lights are on.

- The **PAPER OUT** light is on when no paper is inserted in the printing section of the print head.
- The **RELEASE** light on indicates that the print head is lifted and the printer is in the paper release mode.

👉 Press the **RELEASE** button to lift the print head.

- ☺ The **RELEASE** light then indicates that the paper has been released from the print head, and may now be inserted or removed.
- ☞ Insert the paper from the front (see illustration) using the guiding rail on the right side until it is stopped by the form stopper.
- ☺ The **PAPER OUT** light goes out.
- ☞ Press the **FORWARD** button (**DR-U295**) or wait for max. 5 seconds until the paper is fed automatically (**DR-298**).
- ☞ The print head is lowered fixing the paper. The **RELEASE** light goes out and the printer is now ready to print.



- ✂ You should not use paper that is perforated at the sides. The perforation indicates "PAPER OUT", so that printing is interrupted.

6.6.2 Replacing a Ribbon

- ☞ Open the printer cover.
- ☞ The cover has ridges on the top right corner and an arrow mark on the bottom left corner. By slightly pressing the ridges on the top right and pulling the cover forward you can easily lift off the cover.
 - Behind the cover there is a cassette with the ribbon.
 - The ribbon cassette is easily released when the printer is in the **RELEASE** and **PAPER OUT** modes.
 - The **RELEASE** status is indicated by the **RELEASE** light.
- ☞ If the **RELEASE** light is not on, press the **RELEASE** button.

- ▶ To take up any slack in the ribbon, turn the feed knob on the left side (TM-U295) or right side (DR-298) of the cassette in the direction of the arrow shown on the cassette.
- ▶ Remove the ribbon cassette by grasping the handle and pulling straight out, until it is noticeably released.
- ▶ Pull the cassette carefully towards you to release the ribbon from the pressure rollers.
- ▶ Now you can insert the new ribbon cassette in the printer.
- ▶ Take care that the ribbon goes below the pressure rollers.
- ▶ Push the cassette firmly until the pins in the back snap in.
- ▶ To take up any slack in the new ribbon, turn the feed knob.
- ▶ Close the cover.



The ribbon cassette can be purchased from F. A. Sening:

- Epson TM-U295 : Part No. **7100031**
- STAR DR-298(-FDW) : Part No. **7100157**

6.7 Discharge operated remotely

The Sening MultiControl package includes a handheld controller with which the MultiFlow can be remotely controlled (see also description in the MultiControl operating manual).

Operation of the MultiFlow remains unaltered even when this remote operation option is used. In addition there is however the opportunity after the start of a discharge (see chapter 6.1 "**Carrying Out a Discharge (Part 1)**" / page 69) to carry out the following operation steps remotely:


- Correction of the pre-set volume in increments of 100 or 1000 with simultaneous display on the handheld controller
- Motor Start/Stop
- Start of the discharge
- Display of discharge volume or flow on the handheld controller
- Control of motor speed during the discharge
- Interruption and resumption of the discharge
- Termination of the discharge
- Emergency Cut-off




Control of motor speed is a remote operation option that can only be implemented with vehicles fitted with electronic motor control. See the description in the MultiControl operating manual.

6.8 Discharge in OBC operating modes

In its present version MultiFlow supports communication with on-board computers (OBC) from third-party manufacturers. This provides many advantages through the use of an electronic itinerary planner in the office.

 This communication with an OBC results in changes to the delivery process.

 When an on-board computer is used the whole of the itinerary planning takes place on the tanker operator's office computing system. The itinerary data is usually transferred in accordance with the TDL² specification. The driver selects a job on the on-board computer and starts the discharge:


- ▶ Introduce the discharge on the OBC. The configuration of this function differs from one manufacturer to another. Please check the details in the appropriate manual.
- ▶ All positions of the selected order will be transmitted to the MultiFlow. At the MultiFlow the list of the planned discharges (positions of the order) will now be displayed:

- ▶ Select the desired product

- ▶ You select the product by entering the number at the beginning of the line (e.g. '3' for "Unleaded fuel") or you position the selection bar using <F1> or <F2> and end by pressing the <Enter> key.

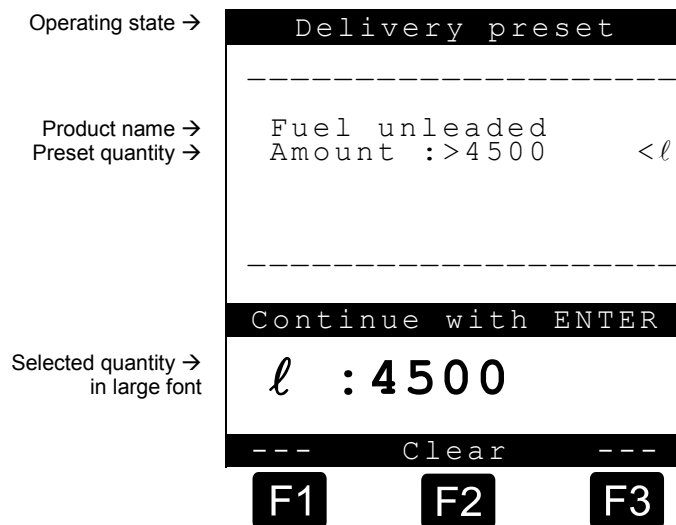
- ▶ If only a single position is transferred, this is automatically selected with no operator action required.

- ▶ After the desired product has been selected, the ordered quantity will automatically be displayed as the pre-set value. The volume will be displayed again in **large figures** below the status line. You can alter these pre-set values by using the number input selector.

 Further details, such as would be necessary in operation without an OBC, are not required here.

Product selection		
Selection:		
1	Diesel	
2	Premium unleaded	
3	Unleaded fuel	
4	Super Unleaded (98)	
UP	Down	---
F1	F2	F3

² TDL:Truck-Data-Link, specification available on request



If the volume pre-set is not working...



Use the **<Stop>** key to leave the selection list at any time without starting a discharge.



If the volume pre-selection is working...

- ▶ Press the **<Start>** key again.
- ▶ The discharge begins.
- ▶ After completion of one discharge the remaining positions of the order are displayed.

6.8.1 Office communication via EMIS



If the MultiFlow is operated together with an EMIS it is possible to transmit delivery- and event data from the EMIS to the office interface (e.g. FTP server). This takes place wirelessly in the case of the EMIS via GSM/GPRS.



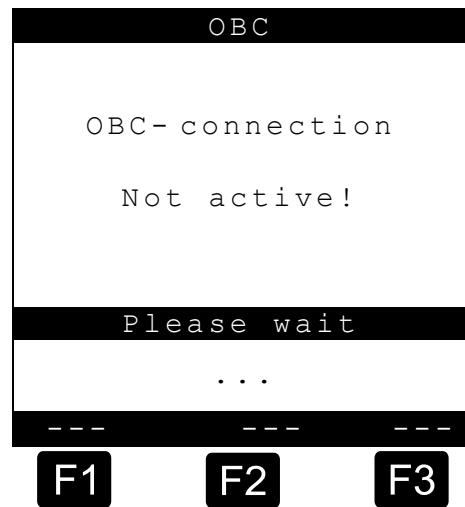
If the MultiFlow is programmed to start a delivery at a particular time but the EMIS is not yet ready for operation, the MultiFlow displays a wait screen before the delivery preset. MultiFlow and EMIS attempt to synchronize during this display. When both devices are ready, the display switches automatically to delivery preset. If synchronization is not possible, the wait screen can be cancelled manually at the earliest after 90 seconds with the **START**, **STOP** or **ENTER** keys to enable a delivery to be initiated (without office connection via EMIS).



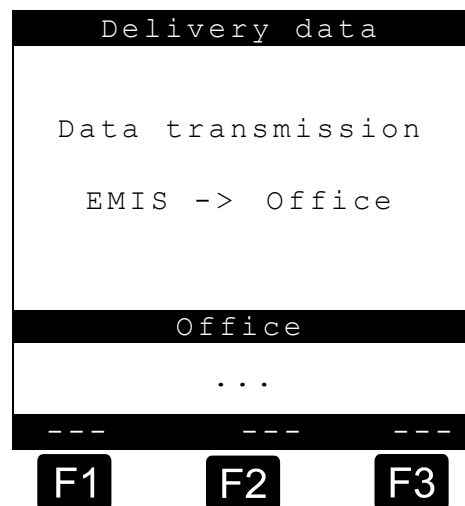
If you do not want the two devices to synchronize, this can be deactivated with parameter **3.1.4.5.8.2**.



MultiFlow displays a special status screen during this period to inform the user about the current transfer status of the EMIS. This provides information about transfer problems and alerts to the end of the transfer. The display of this status screen can be deactivated via **parameter 3.1.4.5.8.1**. In this case information about the transfer status is output only as a system message in the start screen of the MultiFlow.



The current delivery data is transmitted to the EMIS directly after completion of the delivery. The transmission of event data and the trip report can be initiated with menu item **7.2** in the print menu.



If you do not want the delivery data to be transmitted automatically to the EMIS directly after the delivery, activate the parameter "Disable AutoTx" (menu **3.1.6.3.2**).



If synchronization between EMIS and MultiFlow is not possible, the wait screen can be cancelled manually at the earliest after 90sec with the **START**, **STOP** or **ENTER** keys to enable a delivery to be initiated (without office connection via EMIS).

If you do not want the two devices to synchronize, this can be deactivated with parameter **3.1.4.5.8.2**.

6.9 Monitoring the Load

The Load screen is intended for those users who only deliver one product (e.g. heating oil) with their vehicle. The load management can be found in the main menu under Item 6 (**Menu 6**) and contains the following information:

	Load monitor
Remaining volume in the chamber →	Product Load: > 1 2 3 4 5 < ℓ
Remaining additive volume in → the storage container	Additive Load: 1 0 0 , 0 0 ℓ
Trigger alarm on undercutting → of the selected limit	Alarm at: 5 , 0 0 ℓ
	Confirm with PRINT
Echo of entered value →	ℓ 1 2 3 4 5
	--- Clear ---
	<div style="display: inline-block; border: 1px solid black; padding: 2px 10px; margin: 0 5px;">F1</div> <div style="display: inline-block; border: 1px solid black; padding: 2px 10px; margin: 0 5px;">F2</div> <div style="display: inline-block; border: 1px solid black; padding: 2px 10px; margin: 0 5px;">F3</div>

The entry field **"Product Load"** signifies the current remaining volume in the vehicle compartments.

- ☞ Set the initial value just once after loading.
- ☺ Then after each discharge the *uncompensated discharge volume* is subtracted automatically.
- 🔗 You then obtain a quick overview of the current loading state, enabling you to decide whether you can carry on with another delivery or whether you must first load up again.

The remaining load of additive is displayed in the central section of the display. The additive is intended for an additive pump controlled by the MultiFlow.

The field **"Warning at:"** enables you to define a minimum load.

- ☞ Here, you set the minimum value.

The additive load is compared with the minimum volume before each discharge. If the level falls below the limit, a warning is displayed:

"WARNING Additive Load is almost completely used!"



You can deactivate the alarm by setting the minimum volume to zero.

6.10 Product Transfer / Self Loading

Since version 3.15 the MultiFlow offers the option of recording and logging product transfer resp. self loading to compartments of a tank truck. Doing this, the path selection (parameter **3.1.8.1**, chapter 9.3.1.8 "**Valve Control**" / page 141) has to be set to control type no. 5.

Product Transfer or Self Loading is indicated to the MultiFlow by activating the MultiFlow input S4 **before** entering a preset for the discharge. Usually, the Input S4 is connected to an interlock of the filling couplings.

To distinguish Product Transfer and Self Loading, the selected hose is considered:

State of S4	Selected Hose	Operating Mode
OFF	Wet Hose	Normal delivery via wet hose
OFF	Dry Hose	Normal delivery via dry hose
ON	Wet Hose	Product Transfer via wet hose
ON	Dry Hose	Self loading via dry hose

The following points have to be taken under consideration for Product Transfer / Self Loading:

- It is impossible to select and deliver additivated products.
- After carrying out a Product Transfer / Self Loading, no further products can be added to the batch; the receipt will be printed immediately.
- If form element No. 20 is used, receipts will automatically have a corresponding head line (chapter 10.1.3 "**Summary of Text Modules**" / page 195).
- Receipts for Product Transfer / Self Loading may include an additional text which states that this receipt is only for internal use and may not be used for trading:

Only for internal use,

Not Authorized for Trade Use !

This text is stored in the new form element No. 31 (chapter 10.1.3 "**Summary of Text Modules**" / page 195).



Product Transfer means a product is pumped from one compartment of a tank truck into another of the same truck. Possible applications are:

- Combining the remaining volumes of two compartments containing the same product
- Draining of the system (pump, meter, valves, hose, etc.) into a slop tank while filling the system with a different product



To carry out a **Self Loading**, the suction side (inlet) of the pump has to be connected to the depot (additional trailer, storage tank, etc.) while the outlet of the meter has to be connected to the filling coupling of the tank truck compartment via the dry hose.

6.11 MultiFlow emergency power supply MF-EPS (MID version only)

- In case the supply of the primary current fails during a measurement, an emergency program is started in the MultiFlow. The measurement data saved up to this point in time is safeguarded in a non-volatile memory area (battery-buffered). Once the primary current supply returns, the measurement must be ended with a printout before another one can be carried out. In the case of longer power failures it is also possible to display the quantity delivered at the time of the interruption via the MF-EPS emergency power supply.
- If a printout is attempted once the measurement is over with no paper in the printer, then the "Please insert paper" message is displayed. Continued operation of the MultiFlow and startup of a further measurement is blocked until paper has been inserted into the printer and the printout performed.
- Any printer malfunctioning is shown through an appropriate message. The receipt data to be printed out is shown on the display and can be written down.

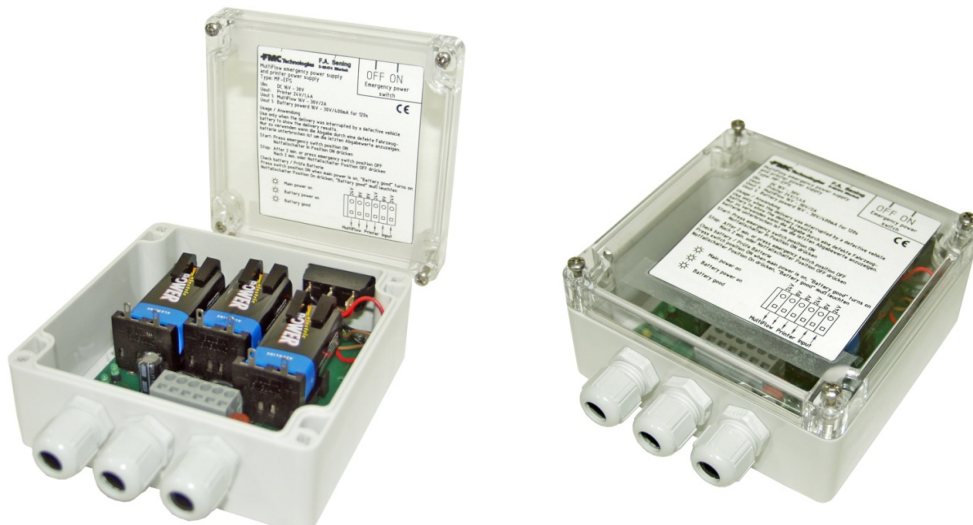


Fig.1: MultiFlow emergency power supply MF-EPS

Use of emergency power supply:

To be used only if the delivery is interrupted by a power failure in order to display the most recent delivery value.

**START:**

Press power failure switch to **ON** position.

**STOP:**

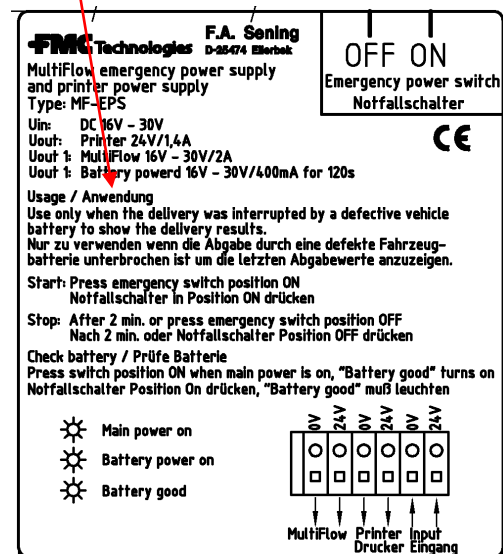
Automatic stop after 2 min.
or press power failure switch to **OFF** position.

**Battery test:**

Press power failure switch to ON position when the power supply is on:
"Battery good" must light up.



Wiring diagrams for MF-EPS see "**E51.352078- Emergency power supply MF-EPS**" / p. 330



6.12 Emergency power supply – Battery change - MF-EPS

MultiFlow Emergency power supply - MF-EPS



Figure 2: MF-EPS

Tools

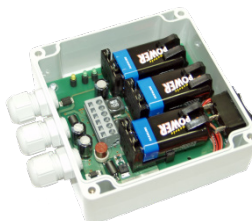
1. Screwdriver 3.5 mm
2. Cross tip screwdriver



Insert batteries



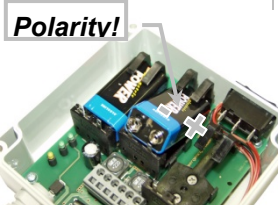
- 1**
Package contents MF-EPS



- 2**
Open the emergency power supply.



- 3**
Insert the batteries and carefully push them into the clamps at a sloping angle.



- 4**
Polarity!
Ensure correct polarity!



- 5**
Press the battery into the holder.



- 6**
Insert the batteries diagonally from above. Polarity!

Remove batteries



7

Lift the battery slightly
with a screwdriver



8

and pull gently upwards and forwards to
remove.

CAUTION: Take care not to damage the clamps!

Notes



Disposal of batteries

The batteries in this unit should be replaced by skilled personnel only. Used batteries must not be disposed of as standard domestic waste. Ensure that all used batteries are disposed of via suitable disposal facilities.

7 Product Definition

The factory settings already include a number of predefined products. They are located in the product register under the position stated in the following table as (**No.**).

No.	PTB-Code	Name	Unit	Density	Price	
					€	Factor
11	1	Heating Oil	ℓ	846	0,00	100
12	2	Diesel	ℓ	836	0,00	100
13	3	Super E5	ℓ	749	0,00	100
14	5	Super E10	ℓ	749	0,00	100
15	6	4-Star	ℓ	753	0,00	100
16	7	Kerosene	ℓ	807	0,00	100
17	8	Jet Fuel	ℓ	801	0,00	100
18	9	Bio Fuel Oil	ℓ	831	0,00	100
19	12	Heating Oil +	ℓ	846	0,00	100
21	-	Additive (1L)	pcs.	-	0,00	1
22	20	Additive (Pump)	ml	-	0,00	1000
31	-	Transport Duty	-	-	0,00	0
32	97	Propane	ℓ	509	0,00	100
33	98	Butane	ℓ	577	0,00	100
34	99	LPG	ℓ	537	0,00	100
35	0	E05	ℓ	739	0,00	100
36	0	E10	ℓ	741	0,00	100
38	0	E80	ℓ	781	0,00	100
39	0	E85	ℓ	785	0,00	100

Note: Programmed calculation for final cost: [4]

Remark:


The total price of each product is calculated as follows:



$$\text{Cost[£]} = \frac{\text{DeliveredAmount[Ltr.]} * \text{Price[£]}}{\text{Factor[Ltr.]}}$$




The price of any individual product can be input as a function of the quantity specified. 5 scales are possible. The first price scale starts with discharge quantity 0, and the price and discharge quantity can be freely defined for all further price scales. Specifying further price scales is optional. If these are not specified, the first price scale is valid for all quantities discharged!

7.1 Define a New Product

 Press function key <F3> to call up the configuration menu.

  To define a new product, select Product Page 3.5. Here you can define 10 products within each of the 3 product pages. The allocation of the products is freely selectable. Packed products and liquid products or even surcharges or services can be defined on the same product page.

Example A packed product with the name "Burny", container size 1l, is to be defined with a price of £ 25.00 on Product Page 2.

 Product Page 2 is selected with key <2>.

Select any product name which is not assigned and labeled "Disabled" by pressing the corresponding key or by using the keys <F1> "Up" or <F2> "Down".

Number of Selection Window →

Product Name→

Function Key Assignment →

Product List

Selection: 352

1 Additive (1l)

2 Additive

3 Disabled

4 Disabled

5 Disabled

6 Disabled

7 Disabled

8 Disabled

9 Disabled

0 Disabled


Up

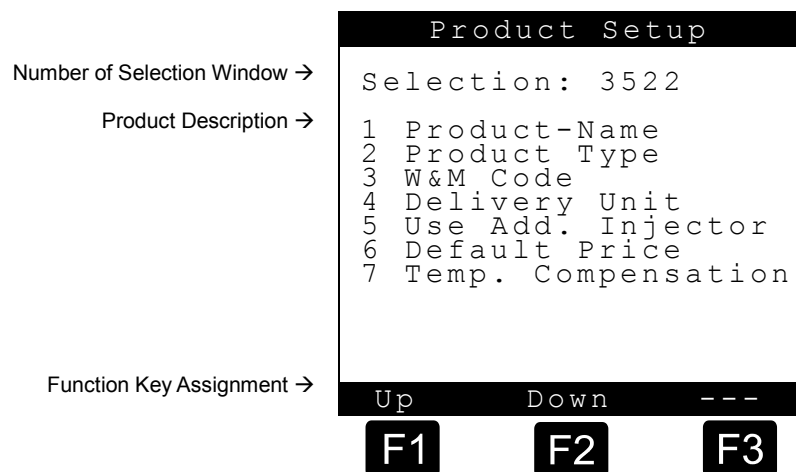
Down

F1

F2

F3

 First, you define the product name by pressing key <1>.



F1 Press key <F1> "**Change**". Now you can enter the text, in this example "Burny", using the keypad.

1 Press key <1> briefly twice. The letter "B" appears.

F1 Press function key <F1> to set the entry of the letter to **lowercase**.

6 **7** Press key <7> briefly **3 times**. Then a lowercase "**u**" appears after the letter B in the text window. Continue the procedure until the complete product name has been entered.

Print Confirm the entered name by pressing <PRINT>.

2 + **4** Next you define the **product type**, in this example a packed product. With key <4> you select "Packed Product", after which operation automatically returns to the start menu.

3 With key <3> you select the **W&M code**. Since a container is involved here, "0" (zero) **must** be entered.

4 With key <4> you define the **unit**. A container is treated like a packed product, i.e. the "3" is selected for piece (pcs.). The selected unit is accepted with <Enter>. Alternatively, liters (L) can also be entered.

Number of Selection Window →

Price default →

Function Key Assignment →

Default Price		
Selection: 35116		
1	Default Price	
2	Price Factor	
3	Tax Rate	
Up	Down	---
F1	F2	F3

Number of Selection Window →

Price Scaling default →

Function Key Assignment →

Default Price		
Selection: 351161		
1	Price Scaling	1
2	Price Scaling	2
3	Price Scaling	3
4	Price Scaling	4
5	Price Scaling	5
Up	Down	---
F1	F2	F3

Number of Selection Window →

Price Scaling default 1 →

Function Key Assignment →

Selection: 3511611		
Delivery Volume 1		
0		

Price Scaling 1		
>0,00000<		
0.000 .. 999999		
Confirm input with <PRINT>		
Cancel input with <STOP>		
Edit	---	---
F1	F2	F3



The next step is to define the **price preset**. Press <6> and <1> to go to the scale prices input (menu **3.5.x.x.6.1**). Enter the respective net price depending on the delivery quantity. Press <Print>. MultiFlow has now accepted the price.

If you are specifying only one price irrespective of the delivery quantity, define only scale price 1. Set all further scale prices and delivery quantities to "0".



Confirm the entered price by pressing <PRINT>.



The **price factor** indicates the quantity factor. In this example the price refers to one piece so a price factor of "1" is entered.



In the case of liquid products the price is normally related to 100 litres so you would need to select liters as the measurement unit and 100 as the factor.

A price factor of "0" indicates a fixed price (for bulk goods only). In this case it is no longer required to indicate the quantity.



Confirm the entered price factor by pressing <PRINT>.



Finally, you define the **tax rate**.

You enter the tax rate applicable to the product.



Confirm the entered tax rate by pressing <PRINT>.



You can disregard point 7 "**Temp. compensation**". This point is only active for liquid products discharged through the flow meter.

7.2 Additive Dispensing

7.2.1 Activating the Additive Pump



When using an additive pump (also called „dosage pump“), the injection point of the additive into the product flow is an important factor.



If additive dispensing takes place *before* the measuring system, the *product including the additive* is measured. In this case the additive is not indicated on the receipts. The difference to a product without additive is shown by a *changed name* (and price).



In contrast, with additive dispensing *after* the measuring system, the additive is shown in addition to the main product (e.g. heating oil). However, in this case it is necessary to have the additive pump accepted by the W & M office. This is not required when injection takes place before the measuring system.



Call up the configuration menu with function key <F3>.

- ▶ Select menu 3.3.3 by pressing key <3> three times.

☺ This give you access to the options for the additive dispensing device.

Stroke frequency The Sening additive pump is a piston pump which regularly discharges full strokes into the product flow. The frequency of the strokes is given by the desired mixing ratio, product flow rate and the capacity of the piston pump.

☞ Press key <1>.

- ▶ The parameter "Piston capacity" is called up.
- ▶ The capacity of the Sening additive pump is approx. 50 ml.

☞ Confirm the capacity value with <Enter>.

- ▶ Define the meter factor of the additive pump with key <2>.

🔗 This factor is mandatory only when the additive dispensing is subject to W & M inspection (see next parameter).

Meter factor The piston capacity is determined during the preliminary testing of the pump and is included with the device. However, since the volume can only be quoted as an integer, the meter factor is required for fine adjustment.

The meter factor is calculated from the division of the volume V_{Std} (parameter 3.3.3.1, "Piston capacity") by V_{PC} (preliminary certificate). The default (neutral value) is 1.0.

☞ Confirm the value with <Enter>.

- ▶ Press key <3>.
- ▶ The injection point at which the additive is discharged into the product flow is now defined:

Injection point selection: 0: No additive dispensing.
1: Additive dispensing before the measuring system.
2: Additive dispensing after the measuring system.

☞ Define the hose volume with key <4>.

🔗 This volume states how much product is taken up by the measuring system and the wet hose.

Hose Volume This volume is required to terminate the additive dispensing before the preselected amount is reached.

Thus the hose is flushed with pure product at the end and no additive remains in the system.



Confirm the value with **<Enter>**.



The parameter "External filling level" is currently not supported.



Call up the parameter "Pump cycle time" with key **<6>**.



This time period specifies the maximum time which the additive pump needs for going through a pump cycle.

Pump Cycle If the cycle is not terminated in the stated time, then the discharge stops and an error message is produced.

The default figure is 6000 msec.



The parameters "Piston initial position" and "Piston end position" state the time for which the piston is to dwell at the corresponding positions so that the suction and discharge functions are ensured.

The default value is 80 msec.

7.2.2 Defining the Additive / Product Containing Additive

When defining the required products, consideration should be given to the fact that the set types of product are defined in the product registers through to the device sealing procedure. This prevents a product subject to W & M inspection from being converted into one that is not subject to W & M inspection after calibration.

This means that at least the main information about the products must be defined before calibration.

For calibration this means that even when injection takes place before the measuring system (not subject to W & M inspection), a register of the type "Additive (pump)" must be created to enable additive dispensing at a later point.



The configuration menu is called with the function key **<F3>**.



To define a new product, select Product Page 3.5.



Here ten products can be defined within each of the three product pages. The allocation of the products is freely selectable. Packed products and liquid products or even surcharges or services can be defined on the same product page.

Example: An additive with the name "Burny", a mixing ratio of 1:2000 and a price of £ 25.00 per liter is to be defined on Product Page 2.



The price of the additive is only used if injection takes place **after** the measuring system or if a container is involved.



Product Page 2 is selected with the key <2>.

	Product List
Number of Selection Window →	Selection: 352
Product Name →	1 Additive 2 Disabled 3 Disabled 4 Disabled 5 Disabled 6 Disabled 7 Disabled 8 Disabled 9 Disabled 0 Disabled
Function Key Assignment →	Up Down --- <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; background-color: black; color: white;">F1</div> <div style="border: 1px solid black; padding: 2px 5px; background-color: black; color: white;">F2</div> <div style="border: 1px solid black; padding: 2px 5px; background-color: black; color: white;">F3</div> </div>

"Disabled"

A product name not yet assigned is identified by "Disabled". You can select same by pressing the corresponding key or by using the key <F1> "Up" or <F2> "Down".

	Additive
Number of Selection Window →	Selection: 3522
Product Description →	1 Product Name 2 Product Type 3 W&M Code 4 Delivery Unit 5 Use Add. Injector 6 Default Price 7 Temp. compensation
Function Key Assignment →	Up Down --- <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; background-color: black; color: white;">F1</div> <div style="border: 1px solid black; padding: 2px 5px; background-color: black; color: white;">F2</div> <div style="border: 1px solid black; padding: 2px 5px; background-color: black; color: white;">F3</div> </div>















First, define the product name by pressing key <1>.








Press key <F1> **Change** and then enter the text, in this case "Burny", using the keypad.



For operation in a multilingual environment the name can be defined in three languages (key <F3>).



-  Press key <1> briefly **twice**. The letter B appears in the text window.
-  With function key <F1> the letter entry is set to "**lowercase**".
-   Press key <7> briefly **3 x**. Then a small "u" appears after the letter B in the text window. Continue the procedure until the complete product name has been entered.
-  Confirm the entered name by pressing <PRINT>.
-  +  Next, the **product type** (key <2>) must be defined. This product is an additive which is to be dispensed through the pump.
Select "Additive" with key <3>.
Operation then automatically returns to the start menu.
-  The **W&M code** can be selected with key <3>. In this example **20** is entered, since an additive is involved.
(Entry only required for additive dispensing **after** the measuring system).
-  With key <4> you define the **unit**. An additive is normally measured in milliliters (ml). The unit is selected by pressing the appropriate number or key F1 <Up> or F2 <Down>.
-  The selected unit is accepted with <Enter>.
The entry of liters (l) is also possible as an alternative.
-  With key <5> the additive dispensing parameters are called up.
-  Under point <3> you enter the mixing ratio.

Example: For additive dispensing of 1:2000, "2000" must be entered.

-  The selected mixing ratio is accepted with <Enter>.
-  The additive options are left with <Stop>.
-  +  The next step is to define the **price preset**.
Press <6> and <1> to go to the scale prices input. Enter the respective price depending on the delivery quantity.
Press <Print>. MultiFlow has now accepted the price.
If you are specifying only one price irrespective of the delivery quantity, define only scale price 1. Set all further scale prices and delivery quantities to "0".
-  Confirm the entered price by pressing <Print>.



Take note of parameter **3.1.4.0** for differentiating between net and gross! The additive price is only used if injection takes place **after** the measuring system.

-  The **price factor** indicates the quantity factor. In our case the price refers to 1000 ml, so 1000 is entered as the price factor.
-  Confirm the entered price factor by pressing <Print>.



Finally, the **tax rate** must be defined.
Here the tax rate applicable to the product is entered.



Confirm the entered tax rate by pressing <Print>.



Disregard point 7 **Temp. compensation**. This option is only active for liquid products discharged through the flow meter.

7.2.3 Defining the Additive Use

In addition to the additive definition, the use of the additive must be entered for the measured product.



To select the product, go to Product Page 3.5.

Example:

The product "Heating oil" is to be dispensed. The general parameters have already been defined as the ninth entry on the first product page.



Select Product Page 1 with key <1>.



Select "Heating oil +" by pressing the corresponding key (<9>) or by using key <F1> "Up" or <F2> "Down" and <Enter>.



Call up the additive dispensing parameters with key <5>.



Here, the additive dispensing can be activated under point <1>.
Set this entry to <1> "Yes".



Call up the additive selection with key <2>. Here the product register number for the desired additive is inserted.

Example:

"Burny" on Product Page 2 at position 2 would have the register number 22. When discharging "Heating oil +", the additive "Burny" would now be automatically mixed at a ratio of 1/2000.



The additive options are left with <Stop>.



The next step is to define the **default price**. You enter the price by pressing keys <6> and <1>.



The price is accepted into the MultiFlow with <Print>.



Take note of parameter **3.1.4.0** for differentiating between net and gross! The price of the product including additive (for injection **before** the measuring system) must include the additive price.



The **price factor** indicates the quantity factor.



With liquid products the price normally refers to 100 litres, so the unit "litres" and the factor "100" must be selected.

Print

The price factor is accepted into the MultiFlow with <Print>.

3
GHI

Finally, the **tax rate** must be defined.
Here the tax rate applicable to the product is entered.

Print

The tax rate is accepted into the MultiFlow with <Print>.

7.3 Product restrictions

Since metering equipment is usually specific to certain product groups, some of the products installed in the factory settings need to be restricted.



Deactivated (restricted) products do not appear on a print-out of the parameter list and also cannot be selected by the operator for a discharge. No calibration of these products is therefore required!

Number of Selection Window →

Product Description →

Function Key Assignment →

Heating Oil+	
Selection: 3519	
1	Product Name
2	Product Type
3	W&M Code
4	Delivery Unit
5	Use Add. Injector
6	Default Price
7	Temp. Compensation
Up	Down
F1	F2
	F3

2
DEF

In order to bar the product heating oil+ first select the parameter index **3.5.1.9**. Press key <2> to access the type of product.

Number of Selection Window →

Function Key Assignment →

Product Type		
Selection: 35192		
1	Disabled	
2	Liquid Product	
3	Additive (Pump)	
4	Packed Goods	
Up Down ---		
F1 F2 F3		



Press key <1> to deactivate the selected product.



Only after closing the parameter menu and recalling the product register (3.5.1) the product is presented as "Not active" (compare chapter 7.2 "Additive Dispensing" / page 96).

8 W&M Calibration

8.1 Calibrating the measuring system

The MultiFlow supports the calibration of the measuring system using a special routine (service menu). Before calibration you must define the basic parameters of the product (<dg_ref_source_inline>Verweis ---> Produktdefinition</dg_ref_source_inline>):

- W&M code, parameter **3.5.n.n.3**
- Product name, parameter **3.5.n.n.1**
- Product type, parameter **3.5.n.n.2** (2 = liquid product)
- Volume unit, parameter **3.5.n.n.5** (1 = liters)
- Date and time, parameter **1.2** (for the log)



The marker **n.n** determines the product or register number of the product that is to be calibrated.

After the calibration function has been selected (in the SERVICE menu 4.2 "Calibration"), the calibration accuracy is automatically selected (ten times the resolution for standard delivery).



The normal delivery mask appears (see below) in which the product to be calibrated is selected.

Delivery Preset

Prod. Code: 11
 Amount: Heating Oil
 >99999.9<ℓ

Wet Hose
 Continue with ENTER

PN0 : 11

--- Clear ---

F1 F2 F3

Preset Volume, if required

Function Key Assignment



Normally, entry of the preset volume is not used.



In this case the discharge is terminated with the <Stop> key when the calibration vessel is full.



During discharge in the calibration mode, no volume correction is carried out. The temperature compensation as well as any meter factors already defined are disabled.³



Once the discharge is finished, you can read the actual discharged volume on the calibration vessel.

- Enter this volume into the MultiFlow as the target volume.



MultiFlow automatically calculates the meter factor and places the two volumes ("Target" and "Actual") in the below display for comparison.

Volume Established by MultiFlow
Volume established by
Calibration Vessel
Calculated Meter Factor

Correction Table

Volume based on
Old Meter Factor

Calibrate			
Is:	1001,7	ℓ	
Target:	1012,4	ℓ	
Factor:	1.010682		
at:	593	ℓ / min	
Temp:	+15,0	°C	

	Factor	Rate	
(1)	0,987654	200	
(2)	0,991234	400	
(3)	1,010682	>6	<
(4)	1,000000	0000	

VT:	1001,7	ℓ	
v15:	1001,7	ℓ	
--- Clear ---			
F1		F2	F3



The actual volume found by the MultiFlow is always a **raw volume**. This means that it is not affected by meter factors or by temperature compensation.



Check the meter factor used by verifying the volume figure in the lower section of the display, because this value is based on the meter factors **defined before the discharge**.



You can bring the meter slightly to the positive or negative by slightly varying the target value (volume measured by the calibration vessel) upon entry. The following example explains this procedure.

³ Only applies to program version 1.1 and higher. In older versions, the uncompensated volume is displayed during discharge. This might already be based on a defined correction value. However, to calculate the meter factor the **raw volume** is **always** used.

Example:

The MultiFlow display shows exactly 1000.0 l, and a volume of 1000.0 l was measured by the calibration vessel. Due to measurements already taken, the figure displayed by the MultiFlow is to be moved slightly to the **positive**. To do this, you do not enter the "Actual" volume to define the target volume (measurement from the calibration vessel), but a slightly higher value instead.

If, for example, 1010.0 l (see table) is entered, then a meter factor of about 1.01 (positive offset) is produced, i.e. with this meter factor a volume larger by a factor 1.01 is displayed at the next discharge of the same volume.

In the reverse case, i.e. the counter is to be offset slightly to the **negative**; a target value of 990.0 l must be entered, respectively. At the next discharge, the actual measured volume is displayed reduced by the factor 0.99.




Examples for positive and negative offsets:

MultiFlow (ACTUAL)	MultiFlow (TARGET)	Meter Factor
1000,0	1010,0	1,010000
1000,0	1000.0	1,000000
1000,0	990,0	0.990000

Normally, only the target figure can be changed when making entries. The actual value is always found by the MultiFlow. The same applies to the other values, e.g. the mean flow.

The meter factor is computed in the MultiFlow according to the following formula:

$$\text{Meter Factor} = \frac{V_{\text{target}}}{V_{\text{actual}}}$$

-  You can now insert the correction value into the correction table using the displayed mean flow rate.
-  Where compensation is *dependent on the flow*, you enter the different flow rates at which the meter factor has been found, into the correction table together with the respective meter factor.
-  If *only one meter factor* is to be used over the complete flow range (which is the normal case), then the **maximum** flow rate of the meter must be

entered as the flow rate. Correspondingly, the meter factor found must be entered under "Factor". All other flow rates must be set to zero.

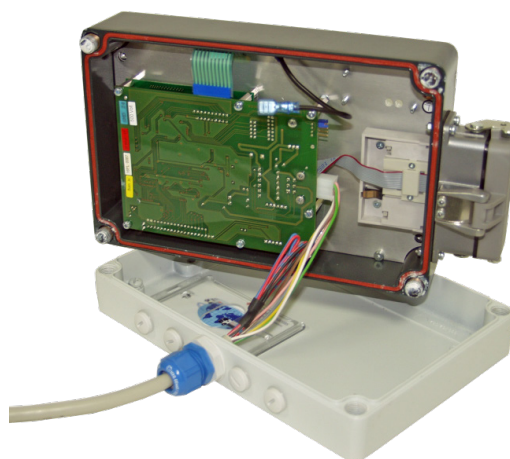
- ☞ After you have terminated the calibration by pressing the key <PRINT>, the original settings (compensation) are activated again, and the new correction table is saved in the product register. In addition, the MultiFlow offers a printout of a calibration log consisting of an expanded delivery note and an extract from the parameter list (i.e. the relevant product register).



General Weights & Measures calibration information is also given in the documentation **DOK-389**. Same is available on request.

8.2 Securing the settings on a chip card (MID version only)


- 🔗 The following description is relevant only for program versions from 5.00 and higher (approval according to MID).
- ☞ Before the electronic W & M seal is set, the parameters must be saved on a separate chip card. The chip card is then deposited in a special holder inside the MultiFlow and secured against loss and manipulation by the housing being subsequently lead-sealed. This ensures that the W&M official is always able to restore the settings when applying the seal.




- ☞ Undertake all the required settings at the MultiFlow.
- ☞ Insert a chip card into the chip card reader.
- ☞ Save the parameters in menu **4.5.2**.


- 😊 After the access rights (master) have been checked a security inquiry follows:
„Data transmitted from MultiFlow to chip card?“
- 👉 Press <F2> (“No”) and the procedure is stopped with no change to the chip card.
- 👉 Confirm with <F1> (“Yes”).
- 😞 Should the chip card have never been used (or only used for other purposes) there is a further warning:
„Chip card error! Incorrect format. Continue?“
- 👉 Press <F2> (“No”) and the procedure is stopped with no change to the chip card.
- 👉 Confirm with <F1> (“Yes”).
- 👉 In view of the memory quantity needed, a CS-CC-512 chip card is to be used.
- 😊 During the transfer, which lasts approx. 90 seconds, the following message appears:
„Transfer in progress... Please wait“
- 😊 The following message is shown at the end of the transmission:
„Successful data transmission!“
- 👉 Confirm this message with <F1> (“OK”).
- 😊 The parameters have now been transmitted.
- 😞 Any error is accompanied by an appropriate notification and the transmission needs to be repeated.
- 👉 Deposit the chip card in the provided holder inside the MultiFlow housing.

8.3 Resetting the download logbook (MID version only)

 The following description is relevant only for program versions from 5.00 and higher (approval according to MID).

 All software download attempts involving changes in the calibration-relevant programming section - whether successful, faulty or aborted – are saved in a special logbook for traceability purposes. The maximum number of admissible downloads is limited to 30. Downloading a software version in which only changes in the non-calibration relevant program section have been carried out does not result in a reduction in the download attempts still available. No further downloads can be carried out should the maximum number be reached or the logbook damaged. In such an instance, the download logbook must be reset via the **"Reset"** (**menu 4.6.4**) item. To this end, the electronic seal must be broken beforehand.

Program update	
Selection:	46
1	Program update
2	Remain. attempts
3	Update report
4	Reset
Forward Back ---	
F1	F2 F3

 To ensure the maximum number of available downloads, the download logbook must be reset via **menu item 4.6.4** before activation of the W & M seal. The update report is automatically printed before the download logbook is reset. If this is not possible, then the reset cannot be carried out.



To guarantee the maximum number of available downloads, it is necessary to reset the download logbook via **menu item 4.6.4** before activating the electronic calibration seal.

8.4 Electronic W & M seal (soft seal)

- The electronic W & M seal is used for monitoring the calibration status of the MultiFlow.
- On calling the seal status (**Menu 4.1.1**), the device checks the checksum over the protected program sections and the status of the non-resettable event counter (Reference).
- The values found as well as the version number and the date of the last calibration are displayed ('Display seal') or printed out ('Print seal').
- The value of the event counter is displayed as "Reference".

Point in time when the last seal took place			
Serial Number →			
Device Number →			
Device Name (Ser.No. of measurement unit) →			
Identification of W&M Official →			
Seal Status →			
Program Information →			
Seal Status			
Date	:	18.11.1997	11:50
Ser.No	:	18-AB-0034	
Device	:	19-CD-0034	
Name	:	PI-LD 824	
By	:	*A275*	
Seal broken			
Version:	:	3.04[3.04]UK	
	:	*056789ABC*	
Reference:	:	*000086*	
Print	:	---	---
F1 F2 F3			

☐ If the displayed data does not match the data in the W & M documentation, then the W & M seal has been broken. A check of the parameters and setting of the W & M seal by an authorized person is required.



By changing any of the parameters relevant to W & M regulations or the protected parts of the program, the checksum and the non-resettable event counter are changed, and the seal is considered 'broken'.



The user is informed about the breaking of the W & M seal by an appropriate notice in the display.



Parameters which are subject to W & M protection can only be changed after breaking the electronic W & M seal. In some countries, the option "break seal" (menu 4.1.3) can be used in order to break the electronic seal.

Delivery			
Heating Oil			
Preset:		5500	ℓ

		150	
Compensated			
to	15°C		ℓ

Wet Hose			
Seal broken!			
Average		+15,8	°C
VT		32.0	ℓ
VT		32.5	ℓ
---	---		>>
F1 F2 F3			



In those countries in which breaking the electronic seal by means of a menu function is not permitted, the housing (of the operator unit) must be opened and a plug-in jumper must be adjusted (c.f. chapter 8.4.1 "Setting of the plug-in jumper" / page 112).

This operation gives access to all parameters, but the electronic seal will automatically be broken.

The menu function "break seal" (menu **4.1.3**) is not accessible in this case.



For calibration or recalibration the function 'Restore seal' (menu **4.1.4**) is called up. This increments the event counter and determines the current date and version number. Then the new checksum is formed. All this data is saved, displayed and printed out in the electronic seal.

Seal Status	
Point in time when the → last seal took place	Date : 08.09.2000 09:47
Serial Number →	Ser.No : 18-AB-0034
Device Number →	Device : 19-CD-0034
Device Name (Ser.No. of → measurement unit)	Name : PI-LD 824
Identification of W&M Official →	By : *0815*
Seal Status →	Seal broken !
Program Information →	Version: 3.04 [3.04] UK *05280A78*
	Reference: *000086*
	Print --- ---
	F1 F2 F3



The entry of an additional password (parameter **3.1.3**) is required to protect the electronic W & M seal.



An erroneous entry of the password leads to a record in the log book. Each time the password is entered incorrectly, the waiting period before a new entry becomes possible is extended (by 1, 15, 60 min).



Restoration of the electronic W & M seal must only be carried out under the supervision of a W & M inspector or an approved maintenance person!



To prevent abuse, the passwords set at the factory, especially the seal password, should be changed during the initial operation. Store them in the measurement system certificate.



The new data (printout) is finally accepted into the W & M documentation. The device is now considered being 'calibrated' again.



In order to change the system date the W&M seal has to be broken! Therefore, it is **essential** to set the date before concluding the calibration. The time is not affected.



An example of a printout of the W & M seal is given in chapter 8.5 "**Print-out of electronic W & M seal**" / page 114.

8.4.1 Setting of the plug-in jumper



In some cases parameters that must be calibrated have to be changed. If you have forgotten the password or if the menu function "break seal" (menu **4.1.3**) is not available, the W & M seal must be broken manually.



Therefore, a jumper has been installed in the operating device of the MultiFlow. The jumper is located inside the operating device at the backside of the keypad and display board. This means it can be easily reached even with AI installations (area subject to explosion hazards).



First switch off the unit and set the plug-in bridge into the central position. Then switch the unit on again.



Before opening the housing and moving the jumper the lead seal must be removed. With AI installations, the jumper is placed in intrinsically safe circuits. Thereby you may open the housing even when the device is being used.



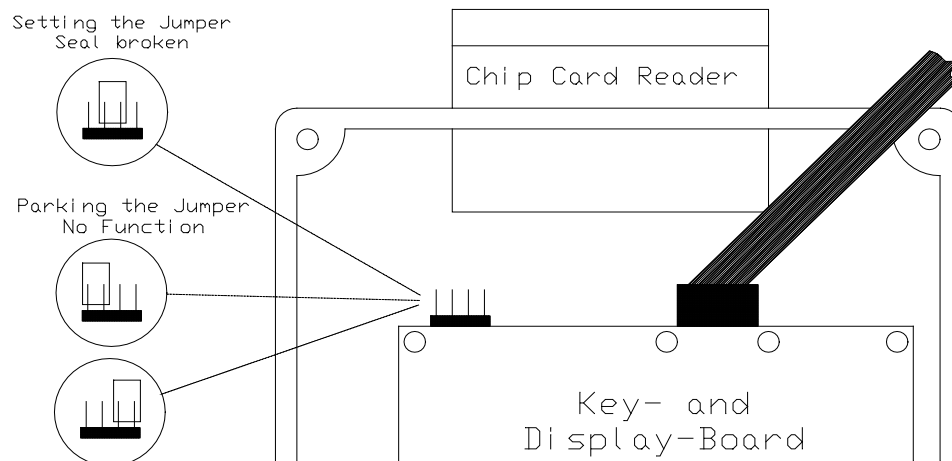
To obtain access to sealed parameters the plug-in contact (jumper) must be inserted in the middle position.



If the jumper is inserted in one of the outer positions, the jumper has no function (park position).



The MultiFlow protective mechanisms are rendered inoperative by setting the jumper. The operator obtains access to all parameters. It will be automatically detected that the soft seal has been broken (a warning is displayed).




The electronic seal has been permanently broken and has to be renewed.



It is not possible to reset the electronic seal without first removing the jumper. If this is attempted, the operator is requested to remove the "Seal switch".

8.5 Print-out of electronic W & M seal

 See the original in the annex, page 109

W&M Seal

Serial Number : 16TK0001
 Device Number : 18UB0001
 Meter Name : Z-4711
 Personnel ID : 999999

Report Date : 06.02.2009 11:45
 Version : 3.54[3.54]GB
 BA7BFA2A
 Setup Count : *000981*

Seal Status

Seal Date : *06.02.2009 11:45*
 Version : *3.54[3.54]GB*
 BA7BFA2A
 Setup Count : *000981*
 Sealed by : *M-044-C*

* The seal is approved!**

17.10.2008/10:56 2 Change(s) [999999]
 12.01.2009/11:06 3 Change(s) [999999]
 12.01.2009/15:38 1 Change(s) [000001]
 12.01.2009/13:01 3 Change(s) [999999]
 03.02.2009/70:07 1 Change(s) [999999]
 03.02.2009/14:43 2 Change(s) [999999]
 03.02.2009/11:40 5 Change(s) [999999]

Electronic Weights & Measures Seal

as Appendix to Measurement System Certificate

The seal was produced by:

Signature and identification of official:

It is essential to observe the following instructions when checking the seal status:

- The seal is not violated by the inspection.
- The opposite seal impression for the MultiFlow can be repeated with the following key combination:
 Switch on, <F1> (Seal status)
 <F1> (Print)
- The code number in the 'Seal status' area on the copy and on the original must match (double-sized printing).
- The text under the code number must read: **The seal is approved!**
- If the details do not match, the seal has been broken. Appropriate action must be initiated.

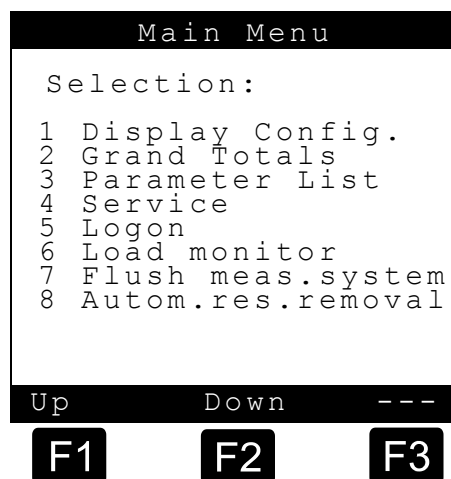
IMPORTANT:

**Illegal modification of the W & M data or
the W & M seal is a punishable offence!**

9 Configuration of the MultiFlow

- ☐ The main menu is reached via function key <F3> in the start screen, and enables the configuration of the MultiFlow. It contains the product parameters as well as settings for the display, printer and the sensors.

- ☞ Selection menu by pressing the <F3> key.



- ☒ The menu item "8 Autom. residue removal" is available from version 5.00 and higher (approval according to MID).

- ☐ All entries in the menu can be *viewed* almost without any restriction. Changes, however, are only possible with restrictions, as in particular for the parameter list various access rights have been defined, such as 'Driver', 'Master' or 'Calibrate'.
- ☐ Only settings in the 'Driver' group can be changed at any time. Changes for all other settings will trigger a security query.
- ☐ Parameters in the groups 'Master' and 'Calibrate' require master access, i.e. the operator must identify himself as a master by entering the appropriate password.



With erroneous entry of the password (master code), an entry is made in the log book. Each time the password is entered incorrectly, the waiting period before a new entry becomes possible is extended (by 1, 15, 60 min).



When parameters in the 'Calibrate' group are changed, the non-resettable event counter is automatically incremented. Please also refer to chapter 8.2 "**Securing the settings on a chip card** (MID version only)" / page 107, **Electronic W & M seal (soft seal)**.

9.1 Display Configuration

No.	Name	Seal	K ¹	Factory Setting	Meaning
1	Display Config.				
1.1	Contrast	D	x		Display contrast setting
1.2	Date and Time	M/ Cal	0/x		Sets internal clock IMPORTANT: Date is subject to W & M restrictions!
1.3	User's Language	D	x		Display language for menus, alarms and reports
1.4	Customer's Lang.	D	x		Display language for deliveries and receipts

9.2 Device Settings

No.	Name	Seal	K ¹	Factory Setting	Meaning
2	Grand Totals	D	0/x	—	Display of grand totals Long-term and shift counters: <ul style="list-style-type: none"> Sum of uncompensated volume in liters (V₀) Sum of compensated volume in liters (V_T) Sum of masses in kg Sum of measured additive in liters NOTE: The day / shift counter can be reset with function key F1.

9.2.1 Grand Totals

The day and overall total readings are displayed with the function **Grand totals**. The day total can be reset with the function key <F1>, but the overall total readings cannot be reset.

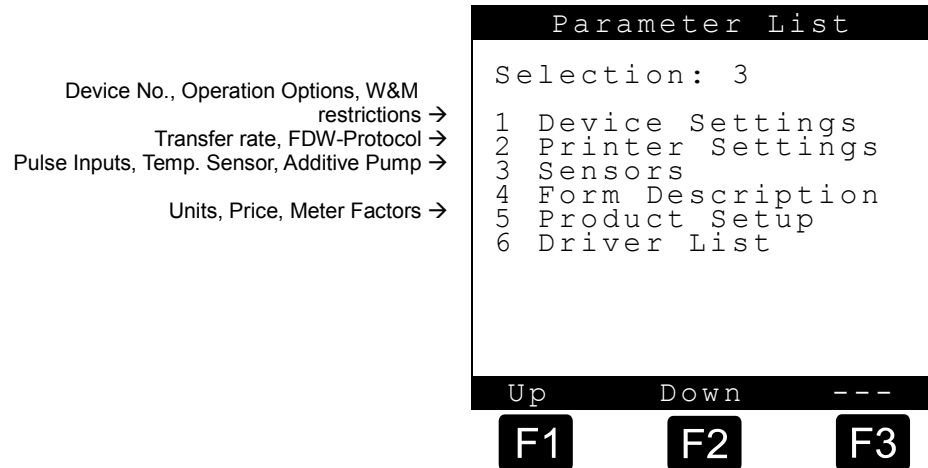


Display of grand totals:

Grand Totals		
Daily/	Overall	Su
Uncompens. Volume	2345/	7209
Compensated Vol.	2601/	4159
Compens. Weight	1761/	2567
Total Additives	0,00/	0,00
Reset	---	---
F1	F2	F3

9.3 Parameter List

The parameter menu contains several topics:



For additional information on the tables refer to chapter 9.1 "Display Configuration" / page 116 up to chapter 9.10 "Product Registers (35nn..)" / page 162.

The complete table of parameters is listed in the annex "Parameter summary".

- The column designated "**No.**" gives the key combination with which the parameter designated in the column "**Name**" is selected. If this number is entered in the main menu via the keypad, the corresponding parameter is called and displayed automatically.
- The column "**Seal**" gives the access rights and the function is described in more detail in the column "**Meaning**".

There are five different **categories** of parameters:

K	Priority	Meaning
0	Cal., EEPROM	Highest security level; device settings which are <i>not</i> saved on the parameter chip
1	Cal.	High security level due to additional checksum; parameter transfer <i>from</i> the chip card only possible when <i>seal is broken</i> !
2	Master	High security level due to additional checksum; parameter transfer <i>from</i> the chip card only possible when <i>seal is broken</i> !
3	Master	Medium security level
x	Driver	Lowest security level; parameters which are <i>not</i> saved on the chip card

Example: After you have opened the main menu via key <F3> you select the parameter "**Billing**" (chapter 9.3.1.4 "**Operating options**" / page 118) with the key sequence <3> <1> <4> <0>. To change the setting master access is required (see indication **M**).



An example of a parameter list is given in "**Printout of Parameter List (example)**".

9.3.1 Device Settings

9.3.1.1 Device Number

9.3.1.2 Meter Designation

9.3.1.3 Seal Password

No.	Name	Seal	K ¹	Factory Setting	Meaning
3	Parameter List				
3.1.1	Device Number	Cal.	1	-	This parameter should be assigned the device ID (name-plate, see housing of operating device).
3.1.2	Meter Designation	Cal.	1	-	This parameter is used for identifying the measuring system. The designation is printed on all delivery notes and reports. Recommendation: Use the serial number of the measuring chamber (name-plate).
3.1.3	Seal Password	Cal.	1	123456	Password protection for electronic W & M seal.

9.3.1.4 Operating options

No.	Name	Seal	K	Factory Setting	Meaning
3.1.4	Operating Options		3		
3.1.4.1	Operating Mode	M	3	0 (Standard)	Selection of operating mode: 1 Standard, support of single and multiple metering systems 2 TMC mode, single and multiple metering systems in conjunction with a TMC 3 OBC mode, single and multiple metering systems in conjunction with an OBC 4 Like TMC mode, manual operation is disabled (remote mode) 5 Like OBC mode, manual operation is disabled (remote mode)
3.1.4.2	Save display	M	3	15	The discharged volume is saved in the display for the selected time in minutes. Thereafter, the ready screen is displayed again.

3.1.4.3	Currency Options		3		
3.1.4.3.1	Applicable Currency	M	3	0 (Currency A)	Selection of applicable currency (A or B). All preset prices, billing and driver input data are computed in this currency. Reference to the second currency can only be made additionally at the end of the receipt/bill (see EURO).
3.1.4.3.2	Exchange Rate	M	3	1.92573	Exchange rate between currencies A+B

3.1.4.3.3	Curr. Symbol Position	M	3	0 (after)	Determines the position of the currency symbol in printouts, i.e. before or after the amount
3.1.4.3.4	Currency Symbol A	M	3	£	Symbol used for currency A
3.1.4.3.5	Curr. Resolution A	M	3	2	Number of post-decimal places for curr. A
3.1.4.3.6	Currency Symbol B	M	3	EUR	Symbol used for currency B
3.1.4.3.7	Curr. Resolution B	M	3	2	Number of post-decimal places for curr. B
3.1.4.3.8	Resolution product price	M	3	5	Number of post-decimal places for product prices

3.1.4.4	Pre-set				
3.1.4.4.1	Standard pre-set	D	x	Country specific	Standard delivery quantity. Displayed in the delivery screen as standard value (pre-set)
3.1.4.4.2	Pre-set type	D	x	0 (comp)	Standard delivery quantity is compensated (0) or uncompensated (1)

3.1.4.5	Queries				
3.1.4.5.1	Driver ID Query	M	3	0 (no)	Activates the automatic driver logon (password query) after switch-on.
3.1.4.5.2	Language Query	M	3	0 (no)	Activates the automatic query for the customer's language before discharge.
3.1.4.5.3	Customer ID Query	M	3	0 (no)	Activates the customer's ID query for deliveries.
3.1.4.5.4	Customer Type Query	M	3	1 (yes)	Activates the customer type query (business or private) which determines whether prices are net or gross. When deactivated, the value of parameter 3.1.4.0.1 is considered automatically.
3.1.4.5.5	Other Products	M	3	1 (yes)	Activates the option to add several products to a delivery (e.g. bulk goods). When deactivated, only one product can be delivered on one receipt.
3.1.4.5.6	Payment Mode	M	3	0 (no)	Activates the payment mode query after printing of invoices.
3.1.4.5.7	Receipt copy	M	3	0 (no)	
3.1.4.5.7.1	Copy query	M	3	0 (no)	Activates request for an additional copy of the receipt immediately after printing the original.
3.1.4.5.7.2	Number of Copies	M	3	0	Standard-setting for the number of copies to be printed after the printing of the original parameters in conjunction with 3.1.4.5.7.1. 0 After each print of a copy, the query shows up again. 1..10 After printing of the original, the number of copies to be printed afterwards can be set (only once).

3.1.4.5.8	Office transfer				
3.1.4.5.8.1	End data transfer	M	3	1 (yes)	After completion of the delivery, activates the status screen which is displayed during the external data transfer from the EMIS to the office interface (e.g. FTP server).
3.1.4.5.8.2	OBC connection	M	3	2 (yes)	Activates wait screen during synchronization of MultiFlow and EMIS before start of delivery. 1 inactive 2 always 3 before delivery 4 after delivery
3.1.4.5.9	Compartment number	M	3	0 (no)	Activates request for the compartment number in the delivery pre-set.
3.1.4.5.0	Order number				
3.1.4.5.0.1	Order number	M	3	0 (no)	Activates request for order number in the delivery pre-set.
3.1.4.5.0.2	Standard pre-set	D/M	3		Standard text for order number

3.1.4.5.0.3	Enhanced protection parameter	M	3	0 (no)	Modification of the parameter 3.1.4.5.0.2 . Only after entering the master password.
-------------	-------------------------------	---	---	--------	---

3.1.4.6	No-load Measurement				(version 5.02 and higher)
3.1.4.6.1	Activate Measurement	M	3	0 (nein)	Activation of the no-load measurement
3.1.4.6.2	Minimum amount	M	3	10	Minimum amount of product which needs to be measured in the amount of time specified in 3.1.4.6.3 so that the delivery is found valid and continued. (1...50 L)
3.1.4.6.3	Active Period	M	3	30	Period in which the minimum quantity of product (3.1.4.6.2) must be measured during idling, so that the measurement is found valid and continued. (1...300 s)
3.1.4.6.4	Timeout	M	3	60	Period after which the product flow is terminated automatically without any further active idle measurement. (1...180 s)
3.1.4.6.5	Info	M	3	0 (no)	Status output in the History window. Helpful during the configuration phase of the no-load measurement.
3.1.4.7	---				
3.1.4.8	Add Surcharge	M	3	0 (no)	Activates special surcharge on the receipt.
3.1.4.9	Default Surcharge	M	3	31	Product code for special surcharge (e.g. transport duty). Default can be changed by the user on site.

3.1.4.0	Billing				
3.1.4.0.1	Billing	M	3	1 (gross)	Activates/deactivates the billing option (c.f. also 3.1.4.5.4): 0: no bill 1: bill based on gross prices (with VAT incl.) 2: bill based on net prices (without VAT)
3.1.4.0.2	Second tax rate	M	3		Only for the English version of the program. Parameter not active in German version.
3.1.4.0.3	Volume limit	M	3		Only for the English version of the program. Parameter not active in German version.
3.1.4.0.4	OBC summary	M	3	0 (no)	Summary of all orders transmitted by the OBC on one receipt

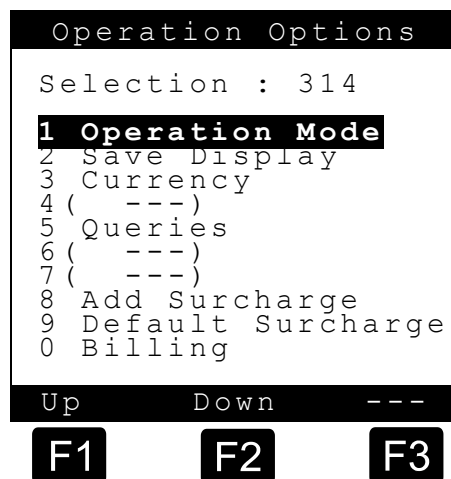
9.3.1.4.1 Customization (Control Options)

- Customer and country-specific settings can be determined in the menu item 'Control Options'.

Options for customer requests



The parameter '**Operation Mode**' is used to set up the MultiFlow for communication with a TMC (Truck-Management-Computer) or OBC (On-Board-Computer). The operation mode is set to 'Std' (Standard) by default. If no TMC or OBC is connected to the MultiFlow, ensure the standard operation mode is selected.



Under the option '**Save display**' you can define the length of time during which the discharged amount is to remain in the display after termination of the discharge. The minimum display period after which the screen is to be cleared is one minute and the maximum settable time is 99 minutes.



The parameter '**Currency**' opens a submenu explained in more detail section "Notes on the Second Currency".



The parameter '**Queries**' opens a submenu explained in more detail in chapter 9.3.1.4.6 "Payment mode query" / page 125 .



For some products a surcharge is applicable, e.g. transport duty. In order not to forget this amount, it is automatically inserted into the invoice if '**Add surcharge**' is set to **1**. Since the surcharge is treated as a product, a product code must be defined for the duty. This product code is entered under '**Default surcharge**'.



The parameter **Billing** opens a submenu explained in more detail in chapter 9.3.1.4.7 "Notes on Billing" / page 126 .

9.3.1.4.2 Notes on the Second Currency



A new parameter menu **3.1.4.3** ('Currency') has been set up for the management of a second currency (e.g. the EURO).

Currency	
Selection: 3143	
1	Valid Currency
2	Exchange Rate
3	Symbol Position
4	Currency Symbol A
5	Currency Resol. A
6	Currency Symbol B
7	Currency Resol. B
8	Res.product price
Up Down ---	
F1	F2 F3



See also chapter 10.1.4 "Control Printout" / page 204.

9.3.1.4.2.1 Valid Currency



In parameter menu **3.1.4.3** two currencies (A and B) can be described. The relevant currency (A or B), in which all prices are saved internally (product register, log book, intermediate sums, operator entries, etc.), is determined via parameter **3.1.4.3.1**. The conversion is made according to the exchange rate saved under parameter **3.1.4.3.2**.

9.3.1.4.2.2 Conversion Factor

Parameter **3.1.4.3.2** ("Exchange rate") has been introduced to enable conversion between the currencies "A" and "B".

Either: $B = A / K$ (A is the valid currency)

or $A = B * K$ (B is the valid currency)

A: Currency A

B: Currency B

K: Exchange rate

Example: A = GBP

B = EUR

$K = A / B = 1,95583$

9.3.1.4.2.3 Currency Symbol Before Amount

In some countries the currency symbol is placed before the amount (e.g. in England and the USA). This can be set via parameter **3.1.4.3.3** ("Position symbol").

9.3.1.4.2.4 Currency Resolution / Rounding Rules

Some currencies do not have sub-units such as "cents" in Germany. With these currencies, no decimal places occur in the amounts.

The parameter "Currency resolution" enables these facts to be taken into account when configuring the MultiFlow. The parameter states how many decimal places are to be taken into account in representing the amounts.

9.3.1.4.2.5 Resolution of product price

The user can define the number of decimal places for the product price using the parameter "Resolution of product price".

9.3.1.4.3 Notes on pre-set options

The user has the opportunity to define both the pre-set quantity as well as the pre-set type. The "Standard pre-set" menu item (**menu 3.1.4.4.1**) is used to set the standard delivery quantity (pre-set). This is the delivery quantity value suggested by the MultiFlow at each delivery. The "Pre-set type" menu item (**menu 3.1.4.4.2**) is used to define whether this standard delivery quantity is a compensated (0) or an uncompensated (1) volume.

9.3.1.4.4 Notes on Query Options

The MultiFlow supports a range of optional queries which enable the operator to adapt the program sequence to his daily routine.



If the driver number is to be always queried after switching on the MultiFlow, then the parameter **Driver no. query** must be set to 1.

- ▶ Querying the driver number is useful if a vehicle may be driven by different drivers. The driver number is then used, for example, to control the printout of the name on the ticket and an unambiguous assignment of the deliveries can be made to each driver.

Queries		
Selection: 3145		
1	Driver ID Query	
2	Language Query	
3	Customer ID Query	
4	Cust. Type Query	
5	Add Products Query	
6	Payment Mode	
7	Document - copy	
8	Office - transfer	
9	Chamber - number	
0	Contract - number	
Up Down ---		
F1 F2 F3		

- ▶ In some countries various languages are spoken depending on the area. To output the ticket in a language different from the operating language, the parameter **Language query** must be set to 1. Before each printout a query is made of which language is to be used for the printout.
- ▶ For some applications it is useful to always give the customer number on the ticket so that later unambiguous assignment of the delivery to a customer can be guaranteed. If **Customer no. query** is set to 1, then a customer number must always be entered.
- ▶ Disabling the query for **further products** makes it possible to summarize a number of products on one delivery note.



If parameter **3.1.5.2** (number of discharges) is set to "1", only one metered product can be recorded per delivery note. Additional products must then be packaged goods!

If an invoice is printed out after discharge, a query can then be displayed after the invoice print-out in which an entry can be made whether and how the invoice has been paid. For this purpose set the **payment mode** to 1.

9.3.1.4.5

Customer Type Query

The query of the **Customer type** gives the operator the option of deciding between two customer groups (assuming this has been activated with parameter **3.1.4.5.4**):

- ▶ "Domestic" Private customers (billing is based on gross prices).
- ▶ "Non-Domestic" Commercial customers (billing is based on net prices).




If the query of the customer type has not been activated (parameter **3.1.4.5.4**), the setting of parameter **3.1.4.0.1** (billing) occurs automatically.


The release of the query of **Other products** enables the operator to combine a number of products on one delivery note.



If parameter **3.1.5.2** (no. of discharges) is set to "1", only one measured product can be recorded per delivery note. Any additional products must be packaged goods!


9.3.1.4.6 Payment mode query

 The payment mode query is activated by parameter **3.1.4.5.6** and takes place after the invoice print-out. The following selection is displayed here:


 The selection made by the operator is saved in the internal logbook together with the discharge information and appears in the print-out of the detailed trip report (see chapter 11.3 "**Detailed Report**" / page 216). Information on the payment is also included if the tour data is saved on a chip card.


Payment mode		
Selection:		
1	No payment	
2	Cash payment	
3	Cheque	
4	Credit card	
5	Direct debit	
UP	Down	---
F1	F2	F3

9.3.1.4.6.1 Request receipt copy

 The request of the output of a receipt copy is activated using parameter **3.1.4.5.7** and takes place after a receipt has been printed. It is then possible to create additional copies immediately after the original receipt has been printed. This is useful, for instance, if not using carbon paper and saves having to make a detour via option 3 of the print menu.

9.3.1.4.6.2 Status display of data transfer from EMIS to the office interface

 In OBC mode the data transferred from the MultiFlow to the EMIS can be transmitted by the EMIS to the office interface (e.g. FTP server). This may take place immediately after a delivery or after a manually started data transfer from the print menu. The transfer of the data from the EMIS via the GSM/GPRS interface takes some time. MultiFlow users are informed about the current transfer status via a status screen which is displayed during this phase. This display is shown until the MultiFlow receives a signal from the EMIS that the transfer has finished. A corresponding message is issued to the user when the transfer complete signal has been sent and/or in the event of transfer problems. If you do not require this status display after delivery, it can be deactivated using parameter **3.1.4.5.8.1**. In this case transfer complete and/or transfer problems are displayed only as system messages in the MultiFlow start screen.

 In the event that a discharge is to be started at a point in time on the MultiFlow when the EMIS is not yet ready to operate, a "Wait" screen will be displayed by the MultiFlow before the actual discharge pre-selection. Whilst this display is on, try to synchronize the MultiFlow and the EMIS. As soon as both items of apparatus are ready, there will be an automatic

change to discharge pre-selection. If no synchronization is possible, the Wait screen can be left at the earliest after 90 seconds via the keys START, STOP or ENTER, to make discharge possible in this case also (without communication with the EMIS). Waiting for synchronization between MultiFlow and EMIS can be deactivated via parameter **3.1.4.5.8.2**.



See also See chapter **Fehler! Verweisquelle konnte nicht gefunden werden. "Fehler! Verweisquelle konnte nicht gefunden werden." / page Fehler! Textmarke nicht definiert..**

9.3.1.4.7 Notes on Billing

If it is necessary to present a bill in addition to the delivery note, the **billing** parameter needs to be set at 1 (for a gross statement) or 2 (for a net statement).



With the setting 0 only delivery notes are printed. The query regarding the desired type of documentation that is otherwise made before printout of a document is absent in this case.



Parameter **3.1.4.5.4** "customer type query" makes it possible to choose between "gross statement" (private customers) and "net statement" (business customers) after each discharge (see chapter 9.3.1.4.5 "Customer Type Query" / page 124).





In the UK there are different rates of tax when invoicing business customers for heating oil. Since these regulations are not applicable in Germany the parameters **3.1.4.0.2** and **3.1.4.0.3** only have a function in the **UK** program version.


9.3.1.4.8 No-load Measurement


3.1.4.6	No-load Measurement				(version 5.02 and higher)
3.1.4.6.1	Activate Measurement	M	3	0 (nein)	Activation of the no-load measurement
3.1.4.6.2	Minimum amount	M	3	10	Minimum amount of product which needs to be measured in the amount of time specified in 3.1.4.6.3 so that the delivery is found valid and continued. (1...50 L)
3.1.4.6.3	Active Period	M	3	30	Period in which the minimum quantity of product (3.1.4.6.2) must be measured during idling, so that the measurement is found valid and continued. (1...300 s)
3.1.4.6.4	Timeout	M	3	60	Period after which the product flow is terminated automatically without any further active idle measurement. (1...180 s)

3.1.4.6.5	Info	M	3	0 (no)	Status output in the History window. Helpful during the configuration phase of the no-load measurement.
3.1.4.7	---				
3.1.4.8	Add Surcharge	M	3	0 (no)	Activates special surcharge on the receipt.
3.1.4.9	Default Surcharge	M	3	31	Product code for special surcharge (e.g. transport duty). Default can be changed by the user on site.

 The following description is only relevant to program versions of V5.03 and above (approval acc. to MID).

 The function '*No-load measurement*' is used for product measurement and bypasses the MultiFlow control unit. It is used to measure any dispensed volume of product while the MultiFlow unit is running, without the MultiFlow controlling the dispensing volume. This measurement is only indicated in V_T [L] (at product temperature). Calculation of the volume of product dispensed is based on the specified figure for 'Number of pulses per liter' (parameter **3.3.1.1**). Temperature compensation is not performed.

 To prevent the detection function from becoming 'nervous' and therefore to prevent measuring errors from occurring, within a defined period of time (parameter **3.1.4.6.3**) a minimum volume of product (parameter **3.1.4.6.2**) needs to be measured before the measurement can be found to be valid and for the measuring process then to continue. Failure to meet these criteria causes each measurement to be rejected. Any idle speed measurement found to be valid will be terminated automatically as soon as no further product can be found and measured within a definable period of time (parameter **3.1.6.3.6.4**). The measurement is also terminated as soon as the MultiFlow unit is switched off. In this case, when the MultiFlow unit is next switched on, an evaluation is performed of the idle speed volume of product measured up to the time it was switched off.

 The measuring results of the idle speed measurement are recorded in the logbook as 'IdleDrop' and are also listed in the event and tour reports. For unambiguous identification of the idle speed volume of product, product code '00' is used. In addition, for idle speed dispensing operations, order number '9998' is used (uncontrolled, unplanned dispensing). No assignment number is issued so none is displayed in any of the reports. Data that is not available is marked as '-'. Individual details cannot be altered by the user. In the following examples for event report, short report and detailed report are listed, with two no-load measurements in each of these three sub-reports.

Event Report

Report Date : 29.06.2011 14:51
 Version : 5.03[5.10]DE
 Meter Name : - ? -

 New calibration required!

```

29.06.2011 14:46 ( 1) SysInf: PowerUp
29.06.2011 14:46 ( 2) Office: EMIS detected
29.06.2011 14:46 ( 3) GPS: C'5338.544700'N'953.363640
                        'E'26.9'5'2.3'26.90'5'2.3
29.06.2011 14:46 ( 4) Logon: 000001 (driver, driver)
29.06.2011 14:46 ( 5) GPS: C'5338.541040'N'953.361430
                        'E'29.9'5'2.7'29.90'5'2.7
29.06.2011 14:48 ( 6) Drop : (??) Heating oil 1018 L
29.06.2011 14:48 ( 7) Office: SSE success
29.06.2011 14:48 ( 8) Office: ExtTx finished
29.06.2011 14:48 ( 9) IdleDrop: (??) --- 26 L
29.06.2011 14:49 (10) GPS: C'5338.550000'N'953.366020
                        'E'27.6'5'1.4'27.60'5'1.4
29.06.2011 14:50 (11) Drop : (??) Diesel 694 L
29.06.2011 14:50 (12) Office: SSE success
29.06.2011 14:50 (13) Office: ExtTX Finished
29.06.2011 14:50 (14) IdleDrop: (??) --- 55 L
  
```

-End of List-

Fig.: Event Report



If the entry for 'IdleDrop' lies between 'SysInf: PowerUp' and 'Logon', the idle speed measurement was interrupted by switching off the MultiFlow unit. In this case, it might not be possible to measure all of the volume of product dispensed at idle speed.

Tour Report

Report Date : 29.06.2011 14:51
 Meter Name : PI-ME 97
 Personal ID : 999999 (Master)
 Tour Start : 29.06.2011 13:53
 Tour End : 29.06.2011 14:50

Receipt Time	D.	Pr	VT	Temp.	Vo

29.06.2011:					
000704	14:46	1 11 (	1006)	+1	1018
-----	14:48	0 00	26	-(-)
000705	14:49	1 12 (	686)	+1	694
-----	14:50	0 00	55	-(-)

Heating Oil		11	1006		1018
Diesel		12	686		694
Idle Volume		00	81		-

Total			Meter		Tour

Liquids	VT	L	100148030	1692
	Vo	L	100149793	1712
Additive		L	0,05	0,00
Idle Volume	VT	L	6826	81
-End of List-				

Fig.: Short Report

Tour report					
Report Date	:	29.06.2011	15:07		
Meter Name	:	- ? -			
Personal ID	:	999999 (Master)			
Tour Start	:	29.06.2011	13:53		
Tour End	:	29.06.2011	15:06		
No.	Time	Product Name	Unit	VT	
Client	Dura.	Code	Temp.	Unit	Vo
Gross	Rec.	Pay.	Dens.	Mass	
Delivery-Mode			Selected	Hose	
t0	End	CStart	Flow rate		

29.06.2011:					
000704	14:46	Heating Oil	L	1006	
0	1 11	+1	L	1018+	
-	0	0	846,00 kg	861	
Delivery			Wet House		
15	14:47	0L	721 L/min		
-----	14:48	Idle Volume	L	26	
9998	0 00	-	L	-	
-	-	-	- kg	-	
-			-		
-	14:48	0L	- L/min		
000705	14:49	Diesel	L	686	
0	1 12	+1	L	694+	
-	0	0	836,00 kg	580	
Delivery			Wet House		
15	14:50	0L	722 L/min		
-----	14:50	Idle Volume	L	55	
9998	0 00	-	L	-	
-	-	-	- kg	-	
-			-		
-	14:50	0L	- L/min		

Total		Heating Oil	L	1006	
	1 11		L	1018	
	0,00 EUR	846,00 kg		861	
Total		Diesel	L	686	
	1 12		L	694	
	0,00 EUR	836,00 kg		580	
Total		Idle Volume	L	81	
	0 00		L	-	

- EUR		- kg		-

0,00 EUR (Net Invoiced)				
0,00 EUR (Gross Invoiced)				
Totals		Meter		Trip

Liquids	VT	L	100148030	1692
	Vo	L	100149793	1712
		kg	214747	1441
Additive		L	0,05	0,00
Idle Volume	VT	L	6826	81
-End of List-				

Fig.: Detailed Report

Display of sum total readings

- ▶ To display the volume measured at idle speed, an additional V_T sum total counter can be provided. This, in keeping with previous sum total counters, is operated as a resettable single-day counter and not as a resettable indefinite or 'endless' counter. The reading appears on the display screen under menu item 2, 'Sum total readings'. To avoid irritations, the corresponding idle speed V_T counter is only displayed while the 'Idle speed measurement' function is enabled.

Grand Totals		

Daily/Overall-Sum		

Uncompens. Volume	2345/	7209
Compensated Vol.	2601/	4159
Compens. Weight	1761/	2567
Total Additives	0,00/	0,00
Reset	---	---
F1	F2	F3



Provided this is supported by EMIS, idle speed measurements can also be transmitted as event reports to the EMIS. Transmission takes place in FTL format. As a data record for transmission of the dispensing data at idle speed, '11 Transfer' is used. To designate the dispensing data at idle speed, order number '9998' is displayed in conjunction with product code '00' and fault code '1 12 03' (1: fault relating to counter, compensation and sensors, 12: counter, 03: unauthorized opening of additional delivery path).

9.3.1.4.9 The OBC summary



A summary of orders transferred from the OBC can be obtained via parameter **3.1.4.0.4**. If this parameter is deactivated, OBC orders

consisting of several products are processed individually. A separate receipt is produced for each product.

- ☐ If the OBC summary is activated, all products are combined on one receipt. The maximum number of products per receipt is defined in this case via parameter **3.1.5.2** ("Number of deliveries").

9.3.1.5 W & M Restrictions

No.	Name	Seal	K	Factory Settings	Meaning
3.1.5	W & M Restriction				
3.1.5.1	Parameter List 1				
3.1.5.1.1	Volume Resolution	Cal.	1	0	Volume division: Number of post-decimal places on volume display.
3.1.5.1.2	No. of Discharges	Cal.	1	1	Maximum number of discharges per receipt.
3.1.5.1.3	Minimum Preset	Cal.	1	200 (liters)	Minimum default volume for discharge (in increments of 200 liters)
3.1.5.1.4	Minimum Layout	Cal.	1	2,3,(11:12),25	Minimum requirement from W&M for bill / delivery receipt
3.1.5.1.5	Price Correction	Cal.	1	1 (yes)	Determines whether the retrospective modification of prices is permitted with measured products.
3.1.5.1.6	Decimal Separator	Cal.	1	1 (',')	Separator for decimal places: '.' or ','
3.1.5.1.7	Show Additive	Cal.	1	0 (no)	IMPORTANT: Parameter not currently active. See parameter 3.3.3.3 .
3.1.5.1.8	Flushing volume				
3.1.5.1.8.1	Flushing product	Master	3	Product index	Definition of product used to flush the measuring system.
3.1.5.1.8.2	Flushing volume	Master	3	0 (liters)	Specification of the quantity of product used to flush the measuring system
3.1.5.1.8.3	Min. flushing volume	Cal.	1	0 (liters)	Minimum pre-set quantity after a product change (due to product contamination) in liters. Specify according to calibration regulations.
3.1.5.1.8.4	OBC flushing monitor	Master	3	0 (no)	Monitors flushing of measuring system when processing deliveries which have been transferred via OBC. 0: No 1: Yes 2: Automatic
3.1.5.1.9	Force Delivery Stop	Cal.	1	0 (inactive)	Determines the time after which a delivery is automatically terminated when no flow is recognized. Function inactive 1-99 Time limit in minutes
3.1.5.1.0	Hide delivery	Cal.	1	0 (inactive)	When active, actual delivery quantity is not displayed during delivery.
3.1.5.2	Parameter List 2				
3.1.5.2.1	Access density	Calibration supervisor Driver	1	0	Defines parameter protection for product density 0: Seal 1: Supervisor 2: Driver

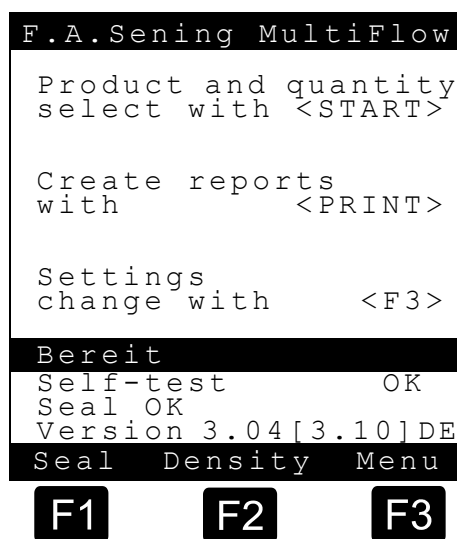
9.3.1.5.1 Access density

- ☐ The protection level for access to the density parameters in product definition (**3.5.x.x.7.4**) can be specified via parameter **3.1.5.2.1**. The protection level for parameter **3.5.2.1** then automatically follows the

settings for the density parameters. There is a choice of “Seal”, “Supervisor” or “Driver”. When “seal” is selected, the electronic seal has to be broken to change product density. “Supervisor” means that at least the supervisor’s password is required to change the product density. If the seal and supervisor password protection is waived, the parameter has to be set to “Driver”. The standard setting is “seal”. This means that the density parameters and parameter **3.1.5.2.1** by default can only be modified if the electronic seal is broken.

- ☐ When the seal protection is activated for the density parameter, stock monitoring can be called up in the start menu via key **<F2>**. In order to facilitate quick access to the density parameter for product definition, when the supervisor or driver protection level is activated, the function of key **<F2>** in the start screen is changed as soon as the density parameter is no longer under seal protection. The product register can now be called up directly from the start screen via **<F2>**. This refers directly back to the relevant product-specific density parameters.
- ☐ Stock monitoring is accessed via menu item 2 when the seal protection for the density parameter is deactivated.

Start screen



9.3.1.6 CAN-Bus (global)

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6	Global CAN-Bus				Changes on CAN Bus parameters take effect only after restart.
3.1.6.1	Global Node No.	M	2	0	Node number (address) of the MultiFlow when several devices are linked to one external CAN Bus. 0: No CAN communication 1: Node no. of the first MultiFlow. Controls the printer (default mode). 2-31: Node no. of the subordinate devices
3.1.6.2	CAN-Termination	M	2	1 (yes)	Controls the electronic termination of the CAN Bus. Must be activated for the devices furthest apart at the CAN-bus, e.g. TMC and second MultiFlow.
3.1.6.3	OBC				
3.1.6.3.1	OBC node	M	2	0	Node number of the TMC or on-board computer, if this has been activated under 3.1.4.1 "Operating mode".
3.1.6.3.2	Disable AutoTX	M	2	0 (no)	Disables delivery data transfer after a delivery. Transfer only possible via PRINT menu.
3.1.6.3.3	Enhanced Document Layout	M	2	0 (no)	Activation of the output of bill of delivery on the delivery receipt at orders received from the OBC.

Remote operation

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.4	Remote operation				
3.1.6.4.1	Use remote operation	M	2	0 (no)	Activation of the remote operation option
3.1.6.4.2	Remote operation node	M	2	0	Node number of the base station of the remote operation, if this has been activated.

Overfill prevention

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.5	Overfill prevention at the service station				
3.1.6.5.1	Transmission interval	M	2	18 (sec/10)	Repeat rate of the overfill prevention signal. If the signal fails the discharge is terminated with an OP error.
3.1.6.5.2	OP node	M	2	0	Node number of the base station of the overfill prevention if this has been activated under 3.1.8.8.

Dead man's switch

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.6	Dead man's switch				
3.1.6.6.1	Use dead man	M	2	0 (no)	Activation of the optional driver attention monitoring device.
3.1.6.6.2	Transmission interval	M	2	18 (sec/10)	Repeat rate of the attention signal. If the signal fails the discharge is terminated with a dead man error.
3.1.6.6.3	Dead man node	M	2	0	Node number of the base station of the monitoring device, if the latter has been activated.

EPE2

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.8	EPE2				(version 5.00 and higher)
3.1.6.8.1	Use of EPE2	M	2	0 (no)	Activation of EPE2 required for optional residue discharge
3.1.6.8.2	EPE2 node	M	2	5	Node number of EPE2 when activated
3.1.6.8.3	EPE2 interval	M	2	600ms	EPE2 request interval. Used to trigger EPE2 inactivity monitor.
3.1.6.8.4	Invert	M	2	0 (No)	Invert the input conditions sent from the EPE2 (including when an EPE2-A1 is used). Short-circuit and interruption are not affected by this.

Sensor interface

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9	Sensor interface				
3.1.6.9.1	Use SI	S/M	2	0 (no)	Activation of the optional sensor module
3.1.6.9.2	SI node	S/M	2	0	Node number of sensor module when activated.
3.1.6.9.3	Compartment number	S/M	2	1	Number of compartments to monitor. (1 .. 20)
3.1.6.9.4	Request interval		2	60s	Average request interval without connecting external power supply. (0 .. 21600s)
3.1.6.9.5	Transmission delay	S/M	2	50ms	Interface-end telegram delay on CAN bus. (0 .. 255ms)
3.1.6.9.6	Trigger interval	S/M	2	5s	Interval before watchdog is triggered (inactivity detection). (0 .. 60)

Sensors

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9.7	Sensors				
3.1.6.9.7.1	Dome cover	S/M			
3.1.6.9.7.1.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.1.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.1.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.2	API coupling	S/M			
3.1.6.9.7.2.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.2.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.2.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.2.4	Delay time	M	2	0s	Delay time for detecting a status change during delivery
3.1.6.9.7.3	Foot valve	S/M			
3.1.6.9.7.3.1	Start sensor pos.	M	2	0	Position of the first sensor

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9.7.3.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.3.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.4	In-line valve	S/M			
3.1.6.9.7.4.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.4.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.4.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.5	Cabinet door left	S/M			
3.1.6.9.7.5.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.5.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.5.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.6	Cabinet door right	S/M			
3.1.6.9.7.6.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.6.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.6.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.7	Handbrake	S/M			
3.1.6.9.7.7.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.7.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.7.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.8	Ext. parameter protection	S/M	2	0 (no)	Activates extended parameter protection. When active, sensor interface parameters can be changed only when the electronic seal is broken.

IO interface

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0	IO interface				
3.1.6.0.1	Use IO	M	2	0 (no)	Activation of the optional IO expansion
3.1.6.0.2	IO node	M	2	0	Node number of the IO expansion, if the latter has been activated.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0.3	Transmission delay	M	2	50ms	Interface-end telegram delay on CAN bus. (0 .. 250ms)
3.1.6.0.4	Outputs				
3.1.6.0.4.1	Output1				
3.1.6.0.4.1.1	Link				
3.1.6.0.4.1.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.1.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.1.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.1.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.1.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined.
3.1.6.0.4.1.2	Additional hose path				
3.1.6.0.4.1.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.1.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.2	Output2				
3.1.6.0.4.2.1	Link				
3.1.6.0.4.2.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.2.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.2.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.2.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.2.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.2.2	Additional hose path				
3.1.6.0.4.2.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.2.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.3	Output3				
3.1.6.0.4.3.1	Link				
3.1.6.0.4.3.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.3.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.3.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.3.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.3.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.3.2	Additional hose path				
3.1.6.0.4.3.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.3.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.4	Output4				
3.1.6.0.4.4.1	Link				
3.1.6.0.4.4.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.4.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.4.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.4.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0.4.4.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.4.2	Additional hose path				
3.1.6.0.4.4.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.4.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.5	Output5				
3.1.6.0.4.5.1	Link				
3.1.6.0.4.5.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.5.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.5.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.5.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.5.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.5.2	Additional hose path				
3.1.6.0.4.5.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.5.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.6	Output6				
3.1.6.0.4.6.1	Link				
3.1.6.0.4.6.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.6.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.6.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.6.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.6.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.6.2	Additional hose path				
3.1.6.0.4.6.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.6.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.7	Output7				
3.1.6.0.4.7.1	Link				
3.1.6.0.4.7.1.1	output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.7.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.7.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.7.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.7.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.7.2	Additional hose path				
3.1.6.0.4.7.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.7.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.8	Output8				
3.1.6.0.4.8.1	Link				
3.1.6.0.4.8.1.1	output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.8.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.8.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0.4.8.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.8.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.8.2	Additional hose path				
3.1.6.0.4.8.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.8.2.2	Designation	M	2		Designation of the additional hose path

9.3.1.7 CAN Bus (local)

No.	Name	Seal	K	Factory Setting	Meaning
3.1.7	Local CAN Bus				ATTENTION: The settings for a local (internal) CAN Bus cannot be altered until further notice.
3.1.7.1	Internal Node No.	M	2	0	Node number of the main board on the internal CAN Bus.
3.1.7.2	Display No. 1	M	2	1	Node number of the first display on the internal CAN Bus.
3.1.7.3	Display No. 2	M	2	0 (inactive)	Node number of the second display on the internal CAN Bus.



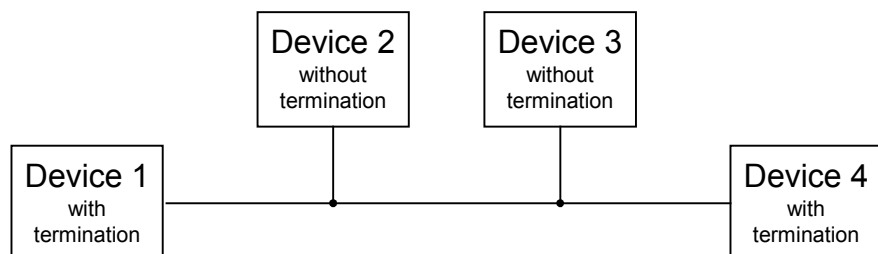
Changes on the CAN Bus parameters will take effect after restarting the system.

9.3.1.7.1 Notes on the CAN Bus Connection



The CAN Bus enables the connection of additional devices (e.g. other MultiFlows or a TMC truck management computer) to the devices using the CAN Bus for communicating between one another.

In order to ensure trouble-free communications on the CAN Bus, the CAN Bus must be “terminated”. This means that termination resistances must be set electronically at both ends of the line.



Termination CAN Bus



Parameter 3.1.6.2 “CAN bus termination” tells a MultiFlow whether the termination is to be activated (1 = “Yes”) or not (0 = “No”). Put differently:

The MultiFlow is informed whether it is the first or last on the CAN bus (termination has to be activated!) or not.

9.3.1.7.1.1 Dual Measuring System

With the use of dual or multiple measuring systems several MultiFlows can share one printer. It must be ensured internally that only one MultiFlow has access to the printer at any one time.

To fulfill this requirement, one of the MultiFlows must grant printing rights to the other devices. This “Master MultiFlow” is always attributed the node number “1” (**parameter 3.1.6.1**). All other MultiFlows should be numbered in increasing sequence.



If the node number “0” is used, no CAN functions are activated. Communication with the device is **not** possible.

9.3.1.7.1.2 OBC operation



With the use of an OBC interface the CAN Bus is used for communication between the MultiFlow and the selected device. To activate the CAN Bus a value greater than “0” must be entered in parameter **3.1.6.1** (global node number). Normally the measurement units receive node numbers in an increasing sequence, beginning with “1”.

To differentiate between the various ways of working the desired operating mode is selected in parameter **3.1.4.1**:

- ▶ **0**: MultiFlow without OBC or TMC
(also multiple measurement system)
- ▶ **1**: TMC operation
- ▶ **2**: OBC operation



When using an OBC, the MultiFlow with the node number “1” automatically transfers the printer administration to the OBC interface.



The OBC interface works in accordance with the EMIS specification (European Multiple Interface System) from Sening, and is therefore designated as an EMIS interface. Documentation is available on request.



In the OBC operating mode a particular format is used for the form: a discharge that has been carried out is recorded in a single original documentation line.



In the **OBC operating mode** the record line is defined using the form layout functions available. These provide opportunities for individual adjustment. The resulting heightened expectations for information presentation are satisfied by the offer of additional form modules.



When combining one or more measurement systems, a CAN termination must similarly be set for the last MultiFlow in the chain only.
None of the other terminations may be activated!

9.3.1.7.1.3 Setting up a RF base station (remote operation)



The MultiControl package from Sening comprises the following components - base station, handheld controller with display, start/stop function and dead man's switch, and also the limit value sensor for overfill protection.

The three basic MultiControl functions are, in addition to motor start/stop:

- ▶ Remote control of the MultiFlow with pre-set volume or flow display, discharge start/stop, etc. **parameter 3.1.6.4**
- ▶ Overfill prevention, **parameter 3.1.6.5**
- ▶ Dead man's switch, **parameter 3.1.6.6**



These functions can be activated independently of each other and allocated to separate base stations. Each parameter group thus has the option of **activation** of any particular function and of setting the CAN Bus **node number**. Usually, however, the functions are dealt with via a single base station with the node number "0".



RF activation of **overfill prevention** does not take place in menu 3.1.6.5, but under **parameter 3.1.8.8**, see chapter 9.3.1.8 "**Valve Control**" / page 141.



The "**transmission interval**" parameter for the dead man and overfill prevention settings defines the interval at which the base station must cyclically provide a status value ("**heartbeat**"), failing which the MultiFlow changes to a 'fault' state.

9.3.1.8 Valve Control

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8	Valve control				
3.1.8.1	Path Selection	Cal.		Basic control	Defines the structure of the measuring system used: 1. Basic control: Basic version with manual operation of a control block and product release. 2. High/Low Flow: as above, but with reduction of the flow at the start and end of the discharge. 3. Fully electronic: Control switch replaced by electronical valve controller. (not supported in current version) 4. Expanded electronical control: as described in 3., but combined with flow control (however, no additive dosing possible). 5. With blow down (GB): special control for GB, with flow control, additive pump, blow down of the dry hose after the discharge and product transfer / self loading. 6. Expanded electronical control: as described in 3., with flow control & additive dosing (no unmetered discharge)
3.1.8.2	Turn-on Delay	M	2	3 (sec)	Delay on activating the control valve before the release valve.
3.1.8.3	Turn-off Delay	M	2	3 (sec)	Delay on closing the release valve before the control valve.

Flow Control

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.4	Flow Control				
3.1.8.4.1	High Flow Rate ON	M	2	5.0 (liter)	Threshold for switchover from a reduced to a higher flow rate: Positive value: Amount in liters Negative values: Flow rate in liters/min.
3.1.8.4.2	High Flow Rate OFF	M	2	20.0 (liter)	Remaining volume at which the switchover to reduced flow rate takes place.
3.1.8.4.3	Wet Hose OFF	M	2	0.5 (liter)	Remaining volume at which the flow is stopped. Used for all hoses, except for Dry Hose (G) or (P)
3.1.8.4.4	Dry Hose (G) OFF	M	2	0.5 (liter)	Remaining volume at which the flow is stopped. Only applicable for Dry Hose and Gravity discharge.
3.1.8.4.5	Dry Hose (P) OFF	M	2	1.5 (liter)	Remaining volume at which the flow is stopped. Only applicable for Dry Hose and pumped discharge.
3.1.8.4.6	Enable Adjustment	M	2	1 (yes)	Enables the automatic adjustment of parameters 3.1.8.4.3 ... 3.1.8.4.5
3.1.8.4.7	---				
3.1.8.4.8	Start delay	M	3	0 m(sec.)	Delay time between hose selection and delivery start. (0 .. 10s).

Draining

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.5	Draining				
3.1.8.5.1	Drain control	M	2	0 (no)	(up to version 5.00) Activates a reminder concerning residue removal in the event of product change.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.5.2	Receipt draining	M	2	0 (no)	(up to version 5.00) Parameter currently not in use. In a future program version will activate printout of a receipt after residue removal.
3.1.8.5.1	Residue removal control	M	2	1	(version 5.00 and higher) 1 : Off 2: Stand-alone Activates a reminder concerning residue removal in the event of product change. 3: EPE2-manual As described under 2; however, the wet leg sensor connected to the EPE2 monitors the residue removal. No restart of MultiFlow required after residue removal. 4: EPE2-AIII As described under 3; however, the "Autom. residue removal" menu item (menu 8) includes the option to control a pump for the measuring system residue removal via the EPE2 output. 5: EPE2-AI As described under 4; but due to the system, instead of a pump, a valve is connected to the EPE2 which gives the additional option of a product change between AI and AIII products.
3.1.8.5.2	Residue removal timeout	M	2	0 (no)	(version 5.00 and higher) Timeout for the autom. draining of the measuring system with the aid of the EPE2 in "EPE2 automatic" mode. Residue removal stops automatically after this period of time.
3.1.8.5.3	Residue removal receipt	M	2	0 (no)	(version 5.00 and higher) Parameter currently not in use. In a future program version will activate printout of a receipt after residue removal.
3.1.8.5.4	With product change	M	2	0 (no)	Residue removal query appears after each product change, unless residue removal had previously been detected.
3.1.8.6	---				No longer applicable from version 2.1 and higher; see 3.1.8.4.3
3.1.8.7	Hose Set	Cal.	1	UVLB	Defines the hose paths that are used in the measuring system for later selection. B Bypass D (L) Dry hose G (S) Dry hose with Gravity discharge P Pumped dry hose discharge U Unmetered W (V) Wet hose Note: Each abbreviation may be used only twice at the most.

Overfill prevention

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.8	Overfill prevention				
3.1.8.8.1	Overfill prevention	M	0	No	The control element function is transferred from the overfill prevention to the MultiFlow. No No monitoring, MultiFlow is not an element of the delivery safety system. Frequency Input: A level sensor with frequency output is used. Switch Input: A level sensor with switch output is used. RF overfill prevention: OP signal is transmitted via RF and base station to the MultiFlow
3.1.8.8.2	Info	D	2	(0) no	Issue a message on change of status of a cable-based overfill prevention.
3.1.8.9	Valve Compilation	M	2	0	Select Valve Compilation (see also 8.3.1.8.5) 0 General configuration 1 GVLx-xM, dry hose operation is modified
3.1.8.0	Blow Down	Cal.	1	8 (sec)	Applicable only for UK version: Blow down of dry hose (duration)

9.3.1.8.1 Notes on the manual control of the hoses

Without full electronic valve control the outputs must be connected to following valves (functions):

Name	Basic Control	Flow Control
Flow Release A	1	1 (low flow)
Flow Release B	-	2 (high flow)
Control Switch Release	2	3



View following drawings in the appendix:
E51.351052 (page 322); E51.351190 (page 147)



During flow control the low flow opening remains active even during high flow (see 70).

9.3.1.8.2 Notes on the full electronic control of the hoses



The full electronic valve control (i.e. hose selection) is controlled by parameter **3.1.8.1**. It replaces the pneumatic control switch and makes it possible to handle the meter without utilization of hand-operated valves.



In order to take over these control functions, MultiFlow requires the *activation* of the electronic control (see above) as well as a *description* of the implemented hoses (discharge passes). This is done at parameter **3.1.8.7**, where all hoses supported by the metering system are listed.

Discharge passes are described by the codes listed in the following table:

Code	Meaning
B	Bypass: Discharge bypassing the overfill prevention system, but limiting the maximum flow rate to 199 ℓ /min (reduced mechanically)
D (L)	Dry Hose: Hose is emptied completely after discharge
P	Dry hose discharge with pump operation
G (S)	Dry hose discharge using gravity
U	Unmetered: Discharge bypassing the meter, no volume is recorded
W (V)	Wet Hose: Discharge through a nozzle, the hose remains filled with product at any time



At parameter **3.1.8.7** you enter the required codes reflecting the actual meter set-up. All codes may be used twice at the most. Also no more than ten paths may be defined at the most.

Please observe the following rules:

- The abbreviations U, D, G and P may only be used once each.
- The abbreviations V and B may be used twice (always in sequence).
- The abbreviations G and / or P can be used as substitutes for D, but never together with D (e.g. UVPG or UVD, but not UVDPG).
- No more than ten discharge paths can be defined.

Example: UWWDBB

Meaning: The meter offers the following discharge passes (see also 312):

1. Unmetered
2. Wet hose 1
3. Wet hose 2
4. Dry hose
5. Bypass 1
6. Bypass 2



The sequence of codes also determines the sequence of the paths presented to the user in the selection list.

The full electronic valve control uses the following output to valve assignment:

	1 Basic Control	2 Flow Control	3 Fully Electronic Control	4 Expanded Electronic Control	5 With blow down	6 Exp. electron. BE
Output 1	Control air	LOW Flow	Wet hose	Wet hose LOW flow	Wet hose LOW flow	Wet hose LOW flow
Output 2	Interlock	HIGH Flow	Dry hose	Dry hose LOW flow	Dry hose LOW flow	Dry hose LOW flow
Output 3	ADD pump	Release control switch	ADD pump	Wet hose HIGH flow	Wet hose HIGH flow	Wet hose HIGH flow
Output 4	-----	ADD pump	Bypass	Dry hose HIGH flow	Dry hose HIGH flow	Dry hose HIGH flow
Output 5	-----	-----	Position 1 Dual hose outlet nozzle	Position 1 Dual hose outlet nozzle	ADD pump	Position 1 Dual hose outlet nozzle
Output 6	-----	-----	Position 2 Dual hose outlet nozzle	Position 2 Dual hose outlet nozzle	-----	Position 2 Dual hose outlet nozzle
Output 7	-----	-----	Unmeasured	Unmeasured	Blow down	ADD pump
Output 8	-----	-----	-----	-----	-----	-----
Output 9	-----	-----	-----	-----	-----	-----
Output 10	-----	-----	-----	-----	-----	-----
Output 11	-----	-----	-----	-----	-----	-----
Input 1	ADD pump rest position	ADD pump rest position	ADD pump rest position	-----	ADD pump rest position	ADD pump rest position
Input 2	ADD pump end position	ADD pump end position	ADD pump end position	-----	ADD pump end position	ADD pump end position
Input 3	ADD pump filling level	ADD pump filling level	ADD pump filling level	-----	ADD pump filling level	ADD pump filling level
Input 4	Overfill prevention amplifier	Overfill prevention amplifier	Overfill prevention amplifier	Overfill prevention amplifier	Product Transfer & Self Loading	Overfill prevention amplifier
Input 5	-----	-----	-----	-----	-----	-----
Input 6	-----	-----	-----	-----	-----	-----
Input 7	-----	-----	-----	-----	-----	-----
Input 8	-----	-----	-----	-----	-----	-----



Output 1..7: MultiFlow
Output 8..11: MFIO-E

Input 1..4: MultiFlow
Input 5..8: MFIO-E

View following drawings in the appendix:

Description	No.	Page
Wiring diagram for MultiFlow, Version AIII	E51.350956	314
MultiFlow AIII Wiring diagram pneum. control switch with flow control – (Belgian version) + dosage pump + overfill prevention amplifier	E51.351052	315
MultiFlow AIII Wiring diagram electronic control + dosage pump + overfill prevention amplifier	E51.351125	316
MultiFlow AIII Wiring diagram electronic control with flow control	E51.351127	322

Description	No.	Page
MultiFlow AIII Wiring diagram electronic control with flow control – (Belgian version) + dosage pump + overfill prevention amplifier	E51.351691	323
MultiFlow AI Wiring diagram pneum. control switch + dosage pump	E51.351190	324
MultiFlow AI Wiring diagram electronic control + dosage pump + overfill prevention amplifier	E51.351189	325
MultiFlow AI Wiring diagram electronic control with flow control	E51.351126	141
MultiFlow AI Wiring diagram electronic control with flow control + dosage pump + overfill prevention amplifier	E51.351692	

9.3.1.8.3 Notes on overfill prevention

Taking control of the servo component is sensible only during simultaneous use of the automatic hose selection (see parameter **3.1.8.1**).

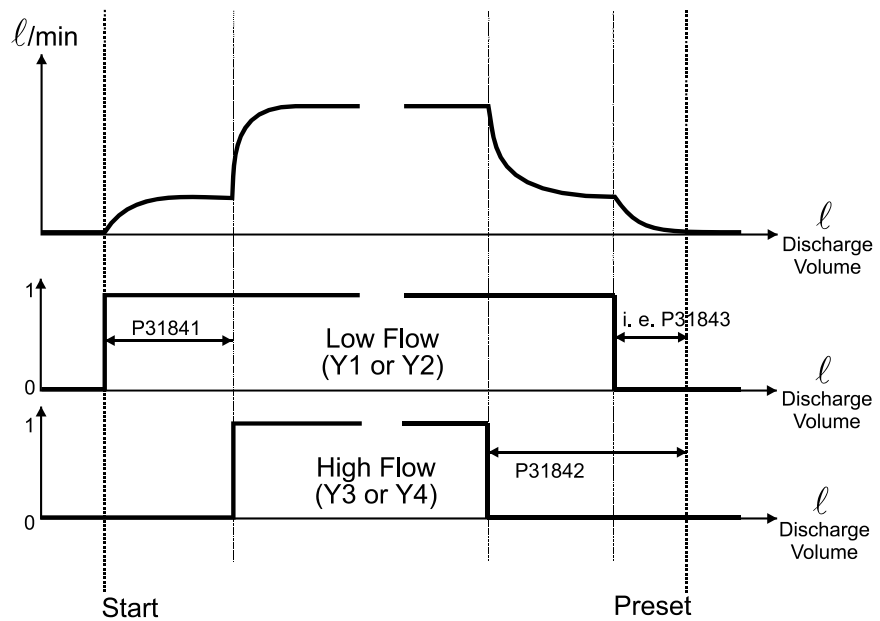
9.3.1.8.4 Notes on blow down

- ☐ Blow down of the dry hose is a function that is required only by the British authorities. At the end of a discharge high pressure air is blown through the dry hose for a set time to completely empty the hose.
- ☐ Because the controller differs, only *special full electronic hose selection* (parameter **3.1.8.1** = 5) can be used in the UK. With manual hose selection the MultiFlow would be unable to decide whether a dry hose was in use and therefore whether blow down was to be activated.

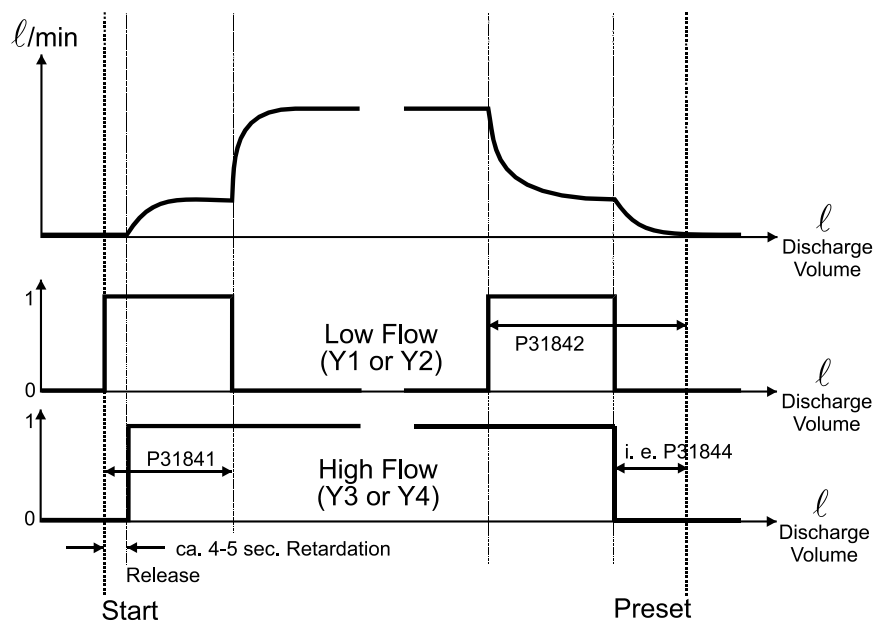
9.3.1.8.5 Notes on Flow Control

The flow control offers the user a precise preset of the discharge volume. The exact discharge will thereby achieved by a two stage shutdown.

Flow control at general valve compilation:



Flow control utilizing the GVLx-xM valve compilation (only dry hose):





Parameter **3.1.8.4.1** controls the switchover from low to high flow:

- + : Entered value interpreted as volume (e.g. +50 = 50 liters): Switching over to high flow takes place after the set quantity has passed through (in this example after 50 liters). During standstill (flow = 0 liters/min.) the system switches back to low flow.
- : Entered value interpreted as a flow rate (e.g. -100 = 100 liters/min.). Switching over to high flow takes place as soon as the set flow rate has been exceeded. Switching back to low flow takes place if the flow is less than 50% of the value set in parameter **3.1.8.4.1**.



The flow control is self-adjusting, i.e. when the discharge is complete a comparison is made between the pre-set volume and the discharge volume achieved. If the values deviate from each other, there is an automatic correction of the predetermined shut off (parameters **3.1.8.4.3 - 3.1.8.4.5**), so that at the next discharge the pre-set amount is maintained precisely.

The adjustment increment never exceeds ± 0.2 liters.

The pre-sets for the parameters **3.1.8.4.3 - 3.1.8.4.5** are automatically overwritten without, however, damaging the electronic seal.

Self-adjustment of the preset switch-off point can be deactivated with parameter **3.1.8.4.6**.

9.3.1.9 Receipt ID

No.	Name	Seal	K	Factory Setting	Meaning
3.1.9	Receipt number				
3.1.9.1	Separate receipt number	Cal.	0	0 (no)	0: Joint numbering cycle for delivery note and invoice numbers 1: Separate delivery note and invoice numbers
3.1.9.2	Receipt number (*)	Cal.	0	0	Number to be used for next receipt
3.1.9.3	Invoice no. (*)	Cal.	0	0	Number to be used for next invoice
3.1.9.4	Delivery note no. (*)	Cal.	0	0	Number to be used for next delivery note

(*): - Depending on the parameter setting **3.1.9.1** either parameter **3.1.9.2** or parameters **3.1.9.3** and **3.1.9.4** are shown.



Separate receipt numbering is activated using parameter **3.1.9.1**. This parameter value is '0' after a reset and the same counter is used for numbering invoices and delivery notes. The next receipt number to be used (delivery note or invoice) is defined with parameter **3.1.9.2**.



If separate receipt numbering is activated, separate counters are used for invoices and delivery notes respectively. The next invoice number to be used is defined using parameter **3.1.9.3**. Parameter **3.1.9.4** determines the next delivery note number to be used.



Since the same receipt numbers can be specified for delivery notes and invoices when using separate receipt numbering, the receipt numbers are identified with an additional identifier. This depends on the customer language in use at the time. If the active customer language is "German"

the delivery note number is prefixed by an 'L' and invoice numbers with an 'R'.



If using separate receipt numbering, it is not possible to use option 3 of the print menu to produce a delivery note from an invoice which has already been printed. It is only possible to produce a copy of the original receipt.

9.3.2 Printer Settings

No.	Name	Seal	K	Factory Setting	Meaning
3.2	Printer	M			
3.2.1	Printer Selection	1:M 2:M 3:M 4:M 5:M 6:M 7:M 8: M 9:Cal.	3	7 (TM-U295)	Printer selection 1: Dr-570 2: DR-290/295 (FDW) 3: DR-298 (FDW) 4: FX (Tally) 5: ASCII 6: TM-U220 7: TM-U295 8: BLASTER ADV. (only MID-Version) 9: No printer (this function is not available in some countries)
3.2.2	Interface Type	M	3	0 (RS232)	Switch between RS232 and RS485.
3.2.3	Transfer Rate	M	3	0 (9600 baud)	Data transmission speed.
3.2.4	Parity Check	M	3	0 (none)	Activation / deactivation of the parity check. 0: No parity 1: Even Parity 2: Odd parity
3.2.5	Lines per Page	M	3	57	Number of lines on a page.
3.2.6	FDW protocol				
3.2.6.1	Protocol	Cal.	1	1 (yes)	Activation / deactivation of the FDW protocol for data subject to W & M restrictions.
3.2.6.2	FDW timeout	M	3	5 (sec)	Max. waiting period for FDW status interrogation.
3.2.6.3	Resends	M	3	2	Number of repeated transmissions when erroneous transmissions occur.
3.2.6.4	Max. error count	Cal.	1	99	Sets the number of erroneous printouts (unsuccessful attempts to print a receipt correctly) which are allowed before the device blocks any further discharges. NOTE: Function currently not supported
3.2.7	Paper feed	M	3	1 (autom.)	Activates the automatic paper feed when using the DR-295.
3.2.8	Reverse ejection	M	3	0 (no)	Enables the reversal of the paper ejection direction for DR-295- and DR-298 printers. 2 no, ejection opposite to printing direction (i.e. "forwards") 1 yes, ejection in the printing direction (i.e. "backwards")
3.2.9	Data bits	M	3	1 (8bit)	Number of data bits for data transfer 0: 7bits 1: 8bits

9.3.2.1 Notes on parity check for FDW



When using an FDW printer, the FDW protocol shown in 3.2.6.1 should be enabled. Unless otherwise described, also set format 8N1 (8 data bits,

no parity, 1 stop bit). This is accomplished using parameters **3.2.6** and **3.2.9**.

9.3.2.2 Note about printing via can bus



In conjunction with the support of MultiControl2, the possibility for printing via the CAN bus was also created on the MultiFlow. Providing that the system in use supports this function (e.g. MultiControl2, MultiSeal), the printing data can also be sent to the MultiFlow via the CAN bus and can then be issued to the printer connected to the MultiFlow unit. The parameter setting required for this can be found in the handbook for the relevant system. Wherever possible, to prevent unnecessary communication overhead (i.e. data traffic volume) on the CAN bus, always ensure that the printer data is sent to the MultiFlow with node number '1'.

9.3.3 Sensors

9.3.3.1 Pulse inputs

No.	Name	Seal	K	Factory Setting	Meaning
3.3.1	Pulse counter				
3.3.1.1	Pulse Rating	Cal.	1	1	Number of pulses per liter (see preliminary certificate and measuring system name-plate).
3.3.1.2	Max. Return Volume	Cal.	1	8 (liter)	Permissible return volume up to which no error is displayed, in liters.
3.3.1.3	Max. Error Pulses	Cal.	1	2	No of permissible error pulses. PTB recommendation: The set value should correspond to twice the pulse rating (i.e. in this case 2 liters)
3.3.1.4	Sensor Type	Cal	1	2 (PNP)	Selection of the pulse transmitter type. 1: NPN 2: PNP (default) 3: THS (Sening GMVT 704/805/1004) IMPORTANT: The type coding is offset by one place from the program version 1.01.!
3.3.1.5	Min. Flow Rate	Cal.	1	20 (L/Min.)	Minimum flow rate during discharge. Flow rates below this limit will switch off pulse error detection and the discharge will be interrupted after 30 seconds. 0: A value of 0 liters/minute will switch off this function.
3.3.1.6	Direction of rotation	Cal.	1	0 (default)	Direction of rotation of the measurement system: 0: default 1: reversal of the direction of rotation

9.3.3.1.1 Notes on the pulse transmitter



Enter the **pulse rating** for the pulse transmitter which is stamped on the identification plate of the flow meter.



Enter the max. **return flow** next.

- ✍ The return flow states the amount of product which the MultiFlow may count in the reverse direction before an error message is output. A normal value is eight liters.

Pulse Counter Menu

- ✍ The maximum **error pulses** state the number of pulses which are regarded as erroneous. If this number is exceeded, then a pulse error is issued and the discharge terminated.

- ✍ Define the connected pulse sensor by entering the **sensor type**.

An NPN, PNP or THS sensor can be connected. You can determine the correct type of sensor from the identification-plate on the flow meter.

Pulse Inputs		
Selection: 331		
1	Pulse Rating	
2	Max.Return Volume	
3	Max.Error Pulses	
4	Sensor Type	
5	Min. Flow Rate	
Up	Down	---
F1	F2	F3

- ✍ Normally with a GMVT 703 or GMVZ 1003, a sensor type with a PNP switching output is used. A THS sensor is used with the GMVT 704, GMVT 805 and GMVZ 1004 measuring systems.

- ✍ Error pulses are not evaluated if the actual flow is below $\frac{1}{2}$ of the **min. flow rate**. Additionally, after consecutive 30 seconds of too low a flow rate, the delivery will be interrupted with a corresponding warning.



- ✍ If the **min. flow rate** is set to 0, error pulses are evaluated in all cases, deliveries will **not** be interrupted on min. flow.

9.3.3.2 Temperature Sensor



No.	Name	Seal	K	Factory Setting	Meaning
3.3.2	Temperature sensor				
3.3.2.1	Temp. Offset	Cal.	1	Preliminary certificate	Figure for temperature offset according to W&M certificate.
0	Offset 0°C	-	0	Device size	Setting for temperature offset. IMPORTANT: The parameter is set during the preliminary test and cannot be changed.
0	Offset 100°C	-	0	Device size	Setting for temperature offset. IMPORTANT: The parameter is set during the preliminary test and cannot be changed.

No.	Name	Seal	K	Factory Setting	Meaning
3.3.2.2	Disable sensor	Cal.	1	0 (No)	(De)activates the MultiFlow temperature measurement. IMPORTANT: With an inactive sensor no compensation and no mass computation can be carried out! IMPORTANT: If no sensor is connected, the temperature inputs must be fitted with a jumper.

9.3.3.2.1 Temperature Sensor (PT 100)

-  A **temperature offset** must be defined to compensate for component tolerances. This temperature offset is determined during the preliminary test with a number of reference temperatures. The values found are included in the preliminary certificate and must not be changed.
-  If during a **recalibration** it is found that the temperature measured by the MultiFlow is no longer within the calibration limits, then parameter **3.3.2.1** must be changed appropriately.

9.3.3.2.2 Working Without a Temperature Sensor

-  If the temperature sensor is disabled (**only applicable from version 2.0 and higher**) no compensated volumes or weight information (calculation is always based on compensated volumes!) may be displayed anymore.
-  These values will not appear in reports (on paper or on the chip card), or they will be set to "0" or "-". The same applies to the corresponding totalizers.



If not temperature sensor is used (e.g. for motor spirits for which no temperature compensation is required) you must take care that bridges are set at the terminals instead of the temperature sensor (PT100).
See drawings 51.350956 (page 312) and 51.350958 (page 321)




9.3.3.3 Additive Pump (also called “dosage pump” or “Injection pump”)

No.	Name	Seal	K	Factory Setting	Meaning
3.3.3	Additive Pump				
3.3.3.1	Piston Capacity	Cal.	1	50 (mℓ)	Additive volume per stroke in mℓ.
3.3.3.2	Meter Factor	Cal.	1	1.0	Correction factor of additive pump. IMPORTANT: Follow chapter 7.2 “Additive Dispensing” / page 96 in setting this parameter.
3.3.3.3	Pump Position	Cal.	1	1	Injection point of additive pump: 0: No function 1: Before measuring system 2: After measuring system (subject to W & M inspection!)
3.3.3.4	Hose Volume	Cal.	1	50 (liter)	Volume of measuring system for wet-hose discharge (measuring system + hose drum) in liters.
3.3.3.5	Ext. Prod. Sensor	M	2	0 (inactive)	Activates monitoring of the filling level on the external storage tank. IMPORTANT: The function is currently not supported.
3.3.3.6	Pump Cycle Time	M	2	6000 (msec)	Maximum time for a pump cycle in msec.
3.3.3.7	Start Interval	Cal.	1	80 (msec)	Minimum dwell time of the piston in the initial position in msec.
3.3.3.8	End Interval	Cal.	1	80 (msec)	Minimum dwell time of the piston in the end position in msec.



Also consider the option of monitoring the load (chapter 6.9 “Monitoring the Load” / page 86) to prevent the additive pump from running dry.

9.3.3.3.1 Notes on the pump position

-  If an additive pump is **not** connected to the MultiFlow, parameter **3.3.3.3** must be set to 0. Activation of the additive operation in the product registers (parameter **3.5.n.n.5.1**) will in this case lead to a parameter error.
-  If dosing of the additive takes place in the product flow **before** the measuring instrument, parameter **3.3.3.3** must be set to 1. In this case the measuring instrument records the volume of the **product plus additive**. As a result the additive is not noted separately on the documents (delivery receipt, invoice, trip report).
-  In the event of dosing of the additive in the product flow **after** the measuring instrument, parameter **3.3.3.3** must be set to 2. In this case the measuring instrument only records the volume of the product without additive, whilst the additive quantity is provided by the number of pump strokes and the (calibrated) volume of one pump stroke. In this case separate details of the additive (description, quantity, price per unit, total price) are given in the documents.



The ability to dose the additives after the measuring instrument depends on the software version.



Depending on the relevant regulations in the respective country it is possible that technical calibration approval may be required for the additive pump in the case of dosing after the measuring instrument.

9.3.3.3.2 Information regarding hose volume



The hose volume of the measurement system includes the metering equipment and the hose reel; it can be set using parameter **3.3.3.4**. The specification of the volume enables **correct additive injection** to the product. In this manner the point in time for injection of the **additive** can be selected such that even before the discharge is complete the additive has been completely pumped out of the system so that none remains in the hose or in the measurement system. You can find further details on this topic in chapter 7.2 "**Additive Dispensing**" / page 96.

9.3.4 Form Description

No.	Name	Seal	K	Factory setting	Meaning
3.4	Form description				
3.4.1	Spacing	M	3	1 (characters)	Entry of spacing for the printout in mm or in characters. Characters is the standard.
3.4.2	Columns Offset	M	3	0	Number of columns before the printout in mm or in characters. Characters is standard.
3.4.3	Lines Offset	M	3	0	Number of lines before the printout in mm or in characters. Characters is standard.
3.4.4	ReceiptLayout	M	2	-	Delivery receipt definition, form dialogue.
3.4.5	Print Form	M			Test printout of the delivery receipt.
3.4.6	Form Elements List	M			Printout of defined elements for describing the delivery receipt.



See also chapter 10 "**Form Description**" / page 190.

9.3.5 Product Definition

No.	Name	Seal	K	Factory Setting	Meaning
3.5	Product Definition				
3.5.1	Product Page 1				Product registers 1.1 - 1.0
3.5.2	Product Page 2				Product registers 2.1 - 2.0
3.5.3	Product Page 3				Product registers 3.1 - 3.0

No.	Name	Seal	K	Factory Setting	Meaning
3.5.nn.7.3 ⁴	Product group	Cal.	1		Determination of the compensation algorithm in dependence of the product group: 1 Packed Goods 2 Crude Oil (API-Table 54A) 3 Refined Oil (API-Table 54B) 4 Special Product (API Table 54X) for liquid gas & bitumen 5 Lube Oil (API-Table 54D) 6 Direct-Linear (Mixed Products) for e.g. E5, E10 ...



See chapter 9.10 "Product Registers (35nn.)" / page 162.

9.3.6 Driver List

No.	Name	Seal	K	Factory Setting	Meaning
3.6	Driver list				
3.6.1	Driver 1	M			Driver Register 1 (entry of the driver's ID and name and of the master code)
3.6.2	Driver 2	M			Driver Register 2 (entry of the driver's ID and name and of the master code)
3.6.3	Driver 3	M			Driver Register 3 (entry of the driver's ID and name and of the master code)
3.6.3	Driver 4	M			Driver Register 4 (entry of the driver's ID and name and of the master code)
3.6.5	Driver 5	M			Driver Register 5, factory definition of master, can be changed.

9.3.6.1 Driver Register (36n..)

No.	Name	Seal	K	Factory Setting	Meaning
3.6.n.1	Driver ID	M	3		Personnel number of the driver
3.6.n.2	Driver Name	M	3		Name of the user, can be printed on receipts.
3.6.n.3	Master code	M	3		If not set to "0", then master code for increased access.

"36n" is the driver's register number, with "n" varying from 1 to 6. For unequivocal identification of a parameter the driver's register number is extended by the parameter number.

⁴ Parameter 3.5.nn.7.3: This parameter is included in all product definitions.
"nn" replaces the actual product register number (10 – 39).

Example: Driver's name in the third driver register





Driver Register	Parameter
36 3	2

The following operators are defined in the factory settings:


Employee ID.	Password	Access Right
000001	- - -	Driver
999999	654321	Master

** Passwords are always 6-digit numbers.*

9.3.6.2 Defining the Driver's Name

-  If several drivers are to drive a vehicle, it may be more practicable to issue a personnel number for each driver. It is then, for example, possible to print the driver's name on the delivery receipt to obtain a clear assignment of deliveries to the drivers.
-  The number is limited to five drivers. You define the drivers in **Menu 3.6**. A list of the currently entered drivers is displayed.
-  In order to be able to make changes to the driver list, the personnel number of the system manager (master) must be entered followed by the master password.
-  This prevents unauthorized persons from changing the driver list.
 - ▶ The personnel number **999999** and master password **654321** are determined in the factory settings. This personnel number is defined as the fifth driver with the name "Master".

Display of driver list

-  To make changes to the settings, a driver is selected from the list of the five drivers using **<Enter>**.
 - ▶ After selecting a driver, you can re-issue the driver ID, the driver's name and the master code.
 - ▶ If zero is entered as the master code, then the driver has no master rights.

Driver List		
Selection: 36		
1	C. Anyone	
2	Driver	
3	Driver	
4	Driver	
5	Master	
Up	Down	---
F1	F2	F3



Take care that at least **one master** is defined, otherwise it is not possible to change the parameters which are subject to the master code.

9.4 Service Menu

9.4.1 Electronic seal

No.	Name	Seal	K	Factory Setting	Meaning
4.1	Electronic seal				
4.1.1	Display Seal	D			Display status of electronic W & M seal.
4.1.2	Print Seal	D			Print status of electronic W & M seal.
4.1.3	Break Seal	M/ Cal.			Breaks the electronic W & M seal to obtain access to sealed parameters. ATTENTION: This function is not available in some countries
4.1.4	Restore Seal	M/ Cal.			Saves modified W & M information. IMPORTANT: To be executed in the presence of a W & M inspector or service person only!

9.4.2 Calibration

No.	Name	Seal	K	Factory Setting	Meaning
4.2	Calibration	Cal.			Procedure for measuring the meter factors at various flow rates.

9.4.3 Diagnosis

No.	Name	Seal	K	Factory Setting	Meaning
4.3	Diagnosis				
4.3.1	In- / Outputs	M/Cal.			Tests the inputs and outputs. IMPORTANT: The setting of the outputs is subject to W & M restrictions!
4.3.2	Printer	M			Loop-back test for testing the printer line with a special printer connector.
4.3.3	Global CAN Bus	M			Display link status of all CAN Bus devices.
4.3.4	Remote control	M			Testing the radio remote control
4.3.5	---				
4.3.6	EPE2	M			(version 5.00 and higher) Testing the EPE2 functions
4.3.7	IO interface	M/Cal.			Testing the external inputs and outputs of the IO module (8 outputs, 2 inputs).
4.3.8	Sensor interface	M			Checking the statuses of the activated sensor inputs of the external sensor module.
4.3.9	TMC test				To test the TMC telegrams. N/A.

9.4.4 Initialize

No.	Name	Seal	K	Factory Setting	Meaning
4.4	Initialize	M/Cal.			Resets the device parameters (restores the factory settings).
4.4.1	Device Parameter	M/Cal.			(version 5.02 and higher) Resets the device parameters
4.4.2	Logbook	M/Cal.			(version 5.02 and higher) Resets the internal logbook

9.4.5 Chip card


No.	Name	Seal	K	Factory Setting	Meaning
4.5	Chip card				
4.5.1	Write Parameters	M/Cal.			Loads all parameters and delivery receipt definition from the chip card.
4.5.2	Read Parameters	M/Cal.			Reads out all the parameters and the delivery definition.
4.5.3	Format Chip	Cal.			Erases all data from a chip card.

9.4.6 Program update

No.	Name	Seal	K	Factory Setting	Meaning
4.6	Program update				(up to version 5.00)
4.6.1	Activated	M			Program update activated
4.6.2	Blocked	M			Program update barred
4.6	Program update				(up to version 5.00)
4.6.1	Program update	M			Enabling/disabling the download
4.6.2	Rem. download attempts	M			Displays the remaining download attempts
4.6.3	Update report	M			Printout of download logbook
4.6.4	Reset	Cal.			Resetting the download logbook

9.4.7 Checksums

No.	Name	Seal	K	Factory Setting	Meaning
4.7	Checksums	F			(version 5.00 and higher) Display of all checksums and version number

 The following description is relevant only for program versions 5.00 and higher (approval according to MID).



Select the "Checksums" menu item (**menu 4.7**) to display the version number and the checksums of the calibration-relevant and non calibration-relevant program chapter. These serve for unique identification of the software. Also displays the arithmetic checksum of the overall software and indicates whether it is an EPROM- or Flash version.

No.	Name	Seal	K	Factory Setting	Meaning
4.8	Sensor monitor				Can only be selected when the connection to the sensor interface is active.
4.8.1	Activation	M		0 (no)	(De) activates the sensor monitor. Time and (where available) GPS position are saved. Monitor remains active until a sensor status change with an activated alarm message is detected.
4.8.2	Status	D			Display of current monitor status
4.8.3	Printing	D			Printout of the sensor monitor status report

9.5 Logon

9.6 Load Monitor

No.	Name	Seal	K	Factory Setting	Meaning
5	Logon	D			Entry of the driver code for a change of drivers (logon).
6	Load Monitor	M			Displays the actual load status and gives the option to set the warning level for "additive load undercut"

9.7 Flush measuring system

No.	Name	Seal	K	Factory setting	Meaning
7	Flush measuring system	F			Start of the flushing process for the measuring system



Flushing of the measuring system is initiated from menu item **7**. The standard value for the flushing process is the flushing product specified via parameter **3.1.5.8.1** with the flushing volume defined by parameter **3.1.5.8.2**. By this means it is ensured that the flushing volume does not fall below the specified minimum (parameter **3.1.5.8.3**).

9.7.1 In OBC mode



Once orders have been transferred from the OBC to the MultiFlow, it is not possible to access menu item 7 without losing the OBC orders. The measuring system flushing is carried out in OBC mode via the variant defined by parameter **3.1.5.8.4**. To have a request for system flushing appear after processing each product, set this parameter to '1'. If

automatic mode is activated with '2' the request for measuring system flushing is given only after the MultiFlow has detected a product change. Setting '0' means that the monitor is deactivated. In this case measuring system flushing can be activated only with menu item 7.



In OBC mode the OBC is not notified about the flushing process.

9.8 Residue removal via EPE2



The following description is relevant only for program versions from 5.00 (approval according to MID).

No.	Name	Seal	K	Factory setting	Meaning
8	Residue removal EPE2	F			Control of a residue discharge pump connected to the EPE2. For this purpose the "EPE2-AIII" or "EPE2-AI" mode must be activated (parameter 3.1.8.5.1).

“Residue removal EPE2” display

- ▶ The “Residue removal EPE2” menu item (**menu 8**) can be used to carry out the residue removal of the measuring system via a residue discharge pump connected to the EPE2. For this purpose an EPE2 must be connected to the MultiFlow and configured via the CAN bus. The "EPE2-AIII" (**menu 3.1.8.5.1.4**) or „EPE2-AI“ (**menu 3.1.8.5.1.5**) must also be active.
- ▶ Residue removal is started by activating the <START> key. Activate the <STOP> key once to pause residue removal and once more to cancel.
- ▶ If residue removal is not cancelled manually using <STOP> it is cancelled automatically after a maximum residue removal period defined in the "Residue removal timeout" menu item (**menu 3.1.8.5.2**).

Residue removal EPE2

Press START to
continue

Press STOP to exit

Residue removal
timeout

.

9 min

F1
F2
F3



During the residue removal through "Residue removal EPE2" (**menu 8**), the residue removal via "EPE2-AI" (**menu 3.1.8.5.1.5**) also monitors the state of the EPE2 sensor. If a complete residue removal cycle is detected, the EPE2 output will be disabled and residue removal will be paused.

9.9 Units



The MultiFlow supports various units, also those which deviate from the ISO standard. These are mainly US and British gallons. When the unit is selected, the appropriate conversion factor from the list shown below is automatically taken into account.

The following units are defined:

Unit	Symbol	Type	Decimal Places	Conversion Factor
Liter	L*	Fluid	3	1.0
Kilogram	kg	Mass	2	1.0
Pieces	pcs.	Piece	0	1.0
Tons	t	Mass	3	0.001
US gallons	gal	Fluid	2	0.264172
Brit. gallons	gal	Fluid	2	0.219960
Milliliter	mL	Fluid	0	1000.0
Cubic centimeter	cm ³	Fluid	0	1000.0
Cubic meter	m ³	Fluid	3	0.001
No unit		Piece	0	1.0

* Shown as 'ℓ' in the display, but printed as 'L'.



All product registers have a reference to the units in which the product is to be discharged. All characteristics of the units are defined in a table and an allocation to each product must be made. The units with the assigned symbols cannot be modified.



The column 'Decimal places' indicates how many places (after the decimal point) may be used as a *maximum* for displaying this value. However, the parameter 'Volume resolution' (**3.1.5.1.1**) has priority and may reduce the precision.

9.10 Product Registers (35nn..)

The placeholder 'nn' in the product register corresponds to the product register number where 'nn' varies from 11 to 30. The product register number is extended by the parameter number to give unambiguous identification of a parameter in a product register.

Example: Mean density on the first product page in the third product register. The placeholder **nn** is in this case substituted by page **1** and register **3** (nn = 13).

Product register		Parameter
Page	Register	
35	1	3
		73

No.	Name	Seal	K	Factory Setting	Meaning
3.5.n	Product pages				
3.5.nn.1	Product name	Cal.	1		Product name
3.5.nn.2	Product type	M/ Cal.	1/3		Product category (1: Liquid product, 2: Additive, 3: Packed products) IMPORTANT: Liquid products can only be activated by breaking the W & M seal!
3.5.nn.3	W&M code	Cal.	1		W&M article code
3.5.nn.4	Unit	Cal.	1		Selection list
3.5.nn.5	Use add. pump				
3.5.nn.5.1	Use add. pump	M	2	0 (no)	This parameter activates the additive dispensing for the selected product register.
3.5.nn.5.2	Additive number	M	2	0	Reference to the register number of the additive to be used. IMPORTANT: The parameter is only active when parameter 3.5.n.5.1 is set to 1 (yes) and 3.3.3.3 is not set to zero (inoperable).
3.5.nn.5.3	Mixing ratio	M	2	2000	Mixing ratio for the additive. IMPORTANT: The parameter is only active for products of type 2 (additive).
3.5.nn.6	Default price				
3.5.nn.6.1	Default price	M	3		Standard price for the product.
3.5.n.n.6.1.1	Scale price 1	M	3	0	Price setting for delivery quantity from 0 upwards.
3.5.n.n.6.1.2	Scale price 2	M	3	0	Price setting for user defined delivery quantity.
3.5.n.n.6.1.3	Scale price 3	M	3	0	Price setting for user defined delivery quantity.
3.5.n.n.6.1.4	Scale price 4	M	3	0	Price setting for user defined delivery quantity.
3.5.n.n.6.1.5	Scale price 5	M	3	0	Price setting for user defined delivery quantity.
3.5.nn.6.2	Price factor	M	3		The standard price applies to 1, 10, 100 units, etc. Price factor "0" defines a fixed price which is not dependent on quantity (packed goods only).
3.5.nn.6.3	Tax rate	M	3		Entry of rate for value added tax (percent).

No.	Name	Seal	K	Factory Setting	Meaning
3.5.nn.7	Temp. compensation				
3.5.nn.7.1	Compensation	Cal.	1	1 (yes)	Activation of compensation: 1. No: Compensation deactivated. Printout carried out with VT. 2: Yes (receipt: V0&VT): VT and V15 printout carried out using form module 12. (Use for products with voluntary compensation.) 3: Yes (receipt: V0): V0 printout carried out using form module 12. (Use for products with statutory compensation.)
3.5.nn.7.2	Comp. temperature	Cal.	1	15°C	Selection of compensation temperature
3.5.nn.7.3	Product group	Cal.	1		Determination of the compensation algorithm in dependence of the product group: 1 Packed Goods 2 Crude Oil (API-Table 54A) 3 Refined Oil (API-Table 54B) 4 Special Product (API Table 54X) for liquid gas & bitumen 5 Lube Oil (API-Table 54D) 6 Direct-Linear (Mixed Products) for e.g. E5, E10 ...
3.5.nn.7.4	Mean density	Cal.	1		Physical constant specified by W&M.
3.5.nn.7.5	Meter Factors				
3.5.nn.7.5.1	Meter Factor 1	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.2	Meter Factor 2	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.3	Meter Factor 3	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.4	Meter Factor 4	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.5	Flow Rate 1	Cal.	1		Upper limit of validity range for Meter Factor 1
3.5.nn.7.5.6	Flow Rate 2	Cal.	1		Upper limit of validity range for Meter Factor 2
3.5.nn.7.5.7	Flow Rate 3	Cal.	1		Upper limit of validity range for Meter Factor 3
3.5.nn.7.5.8	Flow Rate 4	Cal.	1		Upper limit of validity range for Meter Factor 4
3.5.nn.7.5.9	Copying from ...	Cal.	1		Copies the calibration data (see above) from a different product register.
3.5.n.n.7.6	Min. product temp.	Cal.	1	99	Autom. end of delivery in the event of temperature shortfall. Applicable range -20°C to 20°C. The value 99 deactivates this function.
3.5.nn.7.7	Change factor				Required for product group "6 Direct-Linear" to temperature volume compensation of mixed products (E5, E10 ...)
3.5.nn.7.7.1	Min. temperature	Cal.	1	-20	Min. temperature for temperature volume compensation -120 .. 120°C
3.5.nn.7.7.2	Max. temperature	Cal.	1	50	Max. temperature for temperature volume compensation -120 .. 120°C
3.5.nn.7.7.3	Change factor	Cal.	1	0	Density change factor to calculate according to "Method 1" in [1 / K] -1000.0 1000.0 ..., Minimum value: + /-1.0E-7
3.5.nn.8	Hose set	M	2	WP	Allowed hoses for this product, see parameter 3.1.8.7



Comparison must be made with chapter 7 "**Product Definition**" / page 92 !

9.10.1 Note regarding product group "Direct linear"

Temp.Compensation	Dens.change fact.
Selection: 35xx7	Selection: 35xx77
1 Compensation	1 Min. temperature
2 Comp.Temperature	2 Max. temperature
3 Conversation	3 Dens.change fact.
4 Average Density	
5 Meter Factors	
6 Min. Producttemp.	
7 Dens.change fact.	
Up Down ---	Up Down ---
F1 F2 F3	F1 F2 F3



In order to comply with PTB specifications (April 11, 2011, business reference PTB-1.5-4052004) relating to the temperature-volume conversion of fuels based on mineral oil, bio-components and their mixtures (e.g. Super E10), product group '6 Direct-Linear' (parameter **3.5.nn.7.3**) must be selected for the products affected / involved. The product-dependent parameters for this calculation ('Process 1') for temperature range and density change factor must be defined in settings under **3.5.nn 7.7**.



Specified figures for the change-in-density factory acc to PTB announcement (April 11, 2011, business reference PTB-1.5-4052004). The values listed represent the change-in-density factors as of April 11, 2012.

Fuel / Medium	kOE [1/K]
Diesel / Heating Oil / Bio Fuel Oil / Bio Heating Oil	8,40E-04
Jet-Fuel / Petroleum	8,40E-04
Fuel Range 1: 0 – 40 % Ethanol Blending	1,27E-03
Fuel Range 2: 60 – 100 % Ethanol Blending	1,14E-03
Naphta	1,29E-03

- ▶ For products based entirely on mineral oils, the product group selection (parameter **3.5.nn.7.3**) can still be set to 'Refined Oils'.

9.10.2 Notes on the hose set



When using electronic selection of the hose set, to increase the operating safety and to minimize mixtures each product can be assigned to one (or more) defined hose set(s).

The codes to be entered are identical with those for the entry of the hose set which are *available* on the vehicle in parameter **3.1.8.7.** (chapter 9.3.1.8 "**Valve Control**" / page 141).



The addition of a digit after a code serves as the selection between several alternatives.

Example: UV1LB1

Meaning: The meter offers the following discharge passes (chapter 6.4 "**Electronic hose selection (optional)**" / page 76):

1. Unmetered
2. Wet hose 1
4. Dry hose
5. Bypass 1

9.10.3 Notes on scale prices

- The MultiFlow offers the option to specify the product price depending on the delivery quantity. The scale prices 1..5 are used for this (**menu 3.5.nn.7.5.1 .. 3.5.nn.7.5.5**).
- Unlike the scale prices 2..5 the starting delivery quantity for "Scale price 1" is defined as "0". If specifying only one price irrespective of the delivery quantity, carry out the price specification only in "Scale price 1". Set the scale price specifications 2..5 to "0".
- For delivery quantity-dependent prices, specify the respective delivery quantity and the associated product price in the "Scale price 2" to "Scale price 5" menu items.
- The delivery quantities must be in ascending order and unused scale prices must be set to "0"!

9.10.4 Notes on minimum product temperature



You can specify the minimum product temperature using the product-specific parameter **3.5.x.x.7.6**. If product temperature drops below the minimum threshold during delivery, delivery will be automatically interrupted. You can specify a temperature range of -20°C to 20°C. This function is deactivated if you enter 99 (default value).

9.11 Notes on Parameter Checks

- ☐ Parameter checking has been designed to be more operator-friendly. If errors are found during parameter checking, then an alarm message appears on the screen which enables the operator to print a parameter report.
- ☐ The parameter report summarizes all the settings which conflict with the defined boundary conditions.

A parameter report may appear as follows:

Parameter Report		Explanation:
Report date	: 18.08.1998 14.45	
Version	: 2.02[2.00]UK	
Meter desig.	: PI-ME 97	

Recalibration needed!		

Range Error		
3161 Global node no.	32	Parameter 3.1.6.1 : the global node number must not be greater than "31".
(35.11.) Heating oil EL		

Parameter Conflict		
3322 + Sensor inactive	Yes	Parameter 3.3.2.2 , parameter (35.11).71 : Compensation cannot be provided with an inactive temperature sensor!
.71 + Compensation	Yes	
-End of printout-		



In the MultiFlow the following parameter dependencies are currently checked:

Error Message	Meaning
3188 + Overfill Prev. Frequency Input 3335 Ext. Prod. Sensor Yes	The overfill prevention and also the external level sensor for the additive tank use digital input no. 4
3141 Operation Mode TMC 3152 + No. Of Discharges 2	For operation with on-board computers (TMC or EMIS = OBC) only 1 liquid product per receipt can be discharged.
3141 Operation Mode TMC 3161 Global Node No. 0	For operation with on-board computers (TMC or EMIS = OBC) the CAN bus must be activated for communication (node number greater than 0)
3141 Operation Mode OBC 3161 Global Node No. 21 3163 OBC Node 21	For operation with the EMIS interface (OBC) the node numbers of MultiFlow and OBC must be different.
Illegal Value 3187 Hose Set UVPSS	Only one particular number / combination of discharge paths is permissible.

Error Message	Meaning
3181 + Path Selection Extended Electr. 3333 + Pump Position Before	The controller variant specified does not support additive injection.
31437 Currency Resol. B 3 31438 Res. product price 2	The resolution for the product price must be equal or greater than the resolution for the applied currency.
31851 Drain Control Yes 3152 + No. of Discharges 2	With manual residue removal only one liquid product can be specified per receipt.
3181 + Path Selection Extended Electr. 3187 Hose Set UVPSB	For the controller variants specified no bypass discharge is possible.
3181 + Path Selection Blow Down (UK) 3187 Hose Set UVPSB	
3181 + Path Selection Ext.Electron. (BE) 3187 Hose Set UVPSB	
3181 + Path Selection Blow Down (UK) 3187 Hose Set UVPS	For the controller variants specified no unmetered discharge is possible.
3181 + Path Selection Ext.Electron. (BE) 3187 Hose Set UVPS	
31672 Multi-IO Node 21 3163 OBC Node 21	The given components need to have different node numbers.
31672 Multi-IO Node 0 31642 Remote Ctrl Node 0	
31672 Multi-IO Node 0 31652 Level Probe Node 0	
31672 Multi-IO Node 0 31663 Deadman Sw. Node 0	
31672 Multi-IO Node 0 31663 Deadman Sw. Node 0	
Illegal SI-Sensor position 3169711 Start Sensorgrp. 1 3169731 Start Sensorgrp. 1	The start positions of the indicated external sensor interface sensor inputs are overlapping or invalid.
Invalid Parameter Combination 31692 SI node 6 3161 Global node no. 2	Invalid sensor interface configuration. Sensor interface may only be controlled by the master MultiFlow.
No Sensors activated 31691 Use SI 1	External sensor interface control activated without defining the sensor inputs.
(35.11.) ----- Product name illegal .1 + Product name	For each product activated a product name must be allocated in all 3 languages; empty fields (even for only one of the three languages) are not permissible.
(35.11.) Heating Oil ----- Product name illegal .1 + Product Name Heating Oil	
(35.11.) Heating Oil----- -----Range Error.4 + Delivery Unit ??????	The parameter specified lies outside the range of values allowed.
(35.11.) Heating Oil ----- Parameter Conflict .2 + Product Type Liquid Product .4 + Delivery Unit Pieces	Liquid products may not be sold as numbers of pieces.
(35.19.) Heating Oil+ ----- Illegal Value .52 Additive Code 29	For the product specified the additive injection is activated; however, the additive number specified does not relate to an additive.
(35.19.) Heating Oil+ ----- Parameter Conflict .51 Use Add. Injector Yes 3333 + Pump Position No	For the product specified the additive injection is activated; however, according to the setting of parameter 3333 no additive pump is present.
(35.11.) Heating Oil ----- Parameter Conflict .2 + Product Type Liquid Product .73 + Product Group Packed Goods	A liquid product must possess a designation that is compatible for compensation (product group).

Error Message	Meaning
(35.11.) Heating Oil ----- Parameter Conflict 3322 + Disable Sensor Yes .71 + Compensation Yes	For the product specified the temperature compensation is activated; however, according to the setting of parameter 3322 no temperature sensor is installed.
(35.11.) Heating Oil ----- Parameter Conflict .71 + Compensation No .4 + Delivery Unit Kilogram	For calculation of the mass the temperature compensated volume is required.
(35.11.) Heating Oil ----- Parameter Conflict .2 + Product Type Liquid Product .3 + W&M Code 0	Each liquid product measured requires a PTB code for unambiguous identification.
(35.11.) Heating Oil ----- Parameter Conflict .2 + Product Type Liquid Product .62 Price Factor 0	For each liquid product measured a valid price factor must be deposited.
(35.11.) Heating Oil ----- Parameter Conflict .2 + Product Type Packed Goods .3 + W&M Code 22	Only measured liquid products may be assigned a PTB code.

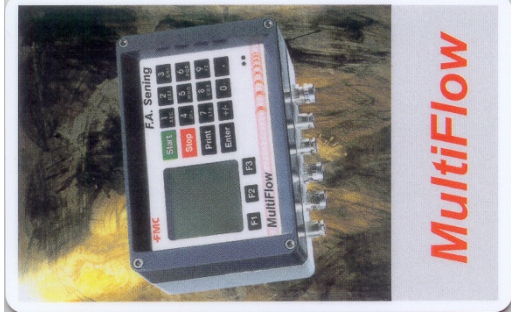

9.12 Saving Parameters on the Chip Card

-  You can save all MultiFlow parameter settings to a chip card using the internal chip-card reader. Please keep this card for the purposes of data back-up.
-  In addition, with a fleet of the same type of vehicles, you can use the parameter chip for universal configuration of the measurement systems without having to manually enter these settings each time. You only need to carry out the settings once on one vehicle and they can then be transferred to the other vehicles by the chip card.



Some parameters which are specific to the measurement systems, such as correction factors and device designations, must be adapted in each case.

Two different versions of the chip card are available:

Picture on card		
Part No.	CS-CC-64	CS-CC-512
Supplied	Until 01 / 2004	From 02 / 2004
Up to version 3.20[3.23]	1 card for parameters	1 card for parameters
Version 3.30[3.30] and higher	2 cards for parameters	1 card for parameters

9.12.1 Saving the Parameters

- ☞ Save the parameters in menu 4.5.2.
- 😊 After checking the access rights (master) a security query is displayed:
"Transfer data from MultiFlow to chip card?"
- ☞ The procedure can be cancelled with <F2> ("No") and the chip card remains unchanged.
- ☞ Confirm with <F1> ("Yes").
- 😞 If the chip card has only been used for other purposes before, another warning is given:
"Chip card error! Incorrect format. Continue?"
- ☞ The procedure can be cancelled with <F2> ("No") and the chip card remains unchanged.
- ☞ Confirm with <F1> ("Yes").
- 😊 During the transfer which takes about 90 seconds, the following information appears:
"Transfer running... Please wait"

- ☺ Starting with MultiFlow software version 3.30[3.30] two cards of type CS-CC-64 are required; therefore after approx. 60 seconds the following message is displayed:
„Please insert next Chip Card!“
- ☞ Confirm the change of the chip card with <F1> („OK“).
- ☺ When the data transfer is completed the following message is displayed:
"Data transfer complete!"
- ☞ Acknowledge this message with <F1> ("OK").
- ☺ The parameters are now transferred.
- ☹ If an error occurs, an appropriate error message is given and the transfer needs to be repeated.

9.12.2 Loading the Parameters from the Chip Card

Data is read from a parameter chip similarly to the saving procedure in menu 4.5.1.



Only deviating memory ranges are transferred!

However, here particular attention should be given to the fact that in the sealed state the MultiFlow only accepts parameters which are **not subject to W & M regulations**.

- ☹ If the parameters subject to calibration regulations deviate from the present settings, the following instruction is given:
"Break the electr. seal before processing this parameter!"
- ☞ Acknowledge this message with <F1> ("OK").
- ☹ Then the following message appears:
"Data transfer unsuccessful!"



The error message only applies to the transfer of parameters subject to calibration regulations. All others will have been transferred.

- ☺ Starting with MultiFlow software version 3.30[3.30] two cards of type CS-CC-64 are required; therefore after about. 60 seconds the following message is displayed:
„Please insert next Chip Card!“
- ☞ Confirm the change of the chip card with <F1> („OK“).

- ☺ When all parameters have been successfully compared, the following message appears:

"Data transfer complete!"

- ☞ Acknowledge this message with <F1> ("OK").

- ☺ The procedure is now completed.



From software version 3.30[3.30] 1 x 16K chip card or 2 x 8K chip cards are used.

9.13 Namur sensor interface - MFSI

Parts no.: **MFSI**

Drawing no.: 61.352182 / S. 341

Circuit diagram no.: 51.352198 / S. 342

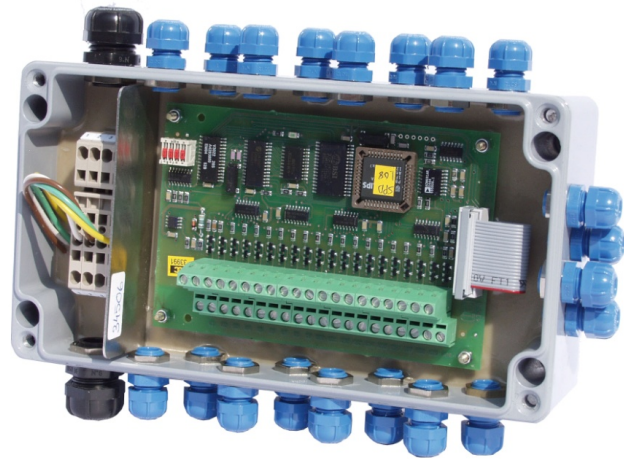


Fig. 3: Namur Sensor interface - MFSI

- ☐ The sensor interface (SI) allows you to connect up to 20 sensors. As with the MultiSeal system the user can assign different sensor positions to these sensors.
- ☐ A simple sensor monitoring function is added to the MultiFlow when the sensor interface is connected. The sensor interface monitors the connected sensors irrespective of the connected operating voltage.

The following sensors are installed:

- Sensors:
(RFID, MSDDST, MSDSO)
- Sensors installed within the fittings:
(VKV1-I, VKV1M-I, VKV1PA-I, BO100-SPD, BO100-F1-SPD, BO100-F2-SPD, DV100-4D, Manlid20-SPD)

- ☐ The sensor interface is connected to the MultiFlow via the external CAN bus.



MFS and the MultiSeal system known SPD sensor interface MSSPD-N2 differ only by the internal software.

9.13.1 Functional Description

9.13.1.1 Turn-on phase

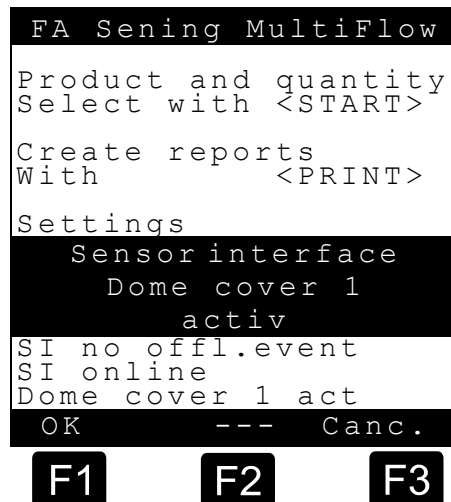
- ☐ The sensor interface is configured corresponding to the user specifications directly after MultiFlow is turned on. In addition to the configuration, the date and time of the sensor interface are compared with those of the MultiFlow. The user is notified about the respective connection status of the sensor module in the event section of the start screen.
- ☐ The sensor monitor is independent of the power supply. Changes at the sensor inputs are recorded even when the measuring system is turned off. The sensor interface checks the sensor statuses at configurable intervals and records any changes detected in its internal logbook. Immediately after switching on, the MultiFlow checks the sensor interface for any saved events and analyses these accordingly.
- ☐ After having processed any offline events, the current statuses of all sensor inputs are detected and recorded in the logbook. This completes the turn-on and configuration phase. The sensor interface is now switched to normal operation (online mode).

9.13.1.2 Online mode

Start screen with alarm message



In the online mode the SI interface notifies the MultiFlow immediately of every change detected at the used sensor inputs. If the MultiFlow is notified of such an event, it is saved in the logbook together with the corresponding GPS data (where available) after verification. In addition to the logbook, detected events are shown in the event section of the start screen and signaled through an alarm message depending on the configuration.



The sensor interface has an inactivity monitor. For this purpose, special TMC telegrams must be sent at regular intervals from the MultiFlow via the CAN bus to the sensor interface. If this does not happen, for instance due to a break in the connection, the sensor interface switches automatically to offline mode. Sensor events are not transmitted directly to the MultiFlow in this case but are recorded in the internal logbook. The MultiFlow automatically reads these once the connection has been restored.



Alarm messages must be acknowledged by the user.



In the case of multiple measuring systems only the master MultiFlow with the node number 1 has access to the sensor interface.

9.13.1.3 Logbook data

The sensor events reported by the sensor interface are saved in the MultiFlow logbook. There are three types of entries generated in connection with the sensor interface:

Offline event data



After switching on the system, before requesting the current input statuses, the sensor events which occurred during the offline phase are

detected and saved in the logbook. The event data stored in the logbook contains the time stamp, the sensor number and the reported sensor status transmitted by the sensor interface. The data is also identified as being offline data.

Sensor index	Group sensors	Sensor index	Individual sensors
1	Dome cover	5	Cabinet door left
2	API coupling	6	Cabinet door right
3	Foot valve	7	Handbrake
4	In-line valve		

Possible statuses:

0 - open, 1- closed, 2 - interrupted, 3 - = short-circuited

Example:

SI: 121208-090536 M:OFF I: 1(1-1) S:1(act)

Offline sensor event

Date: 12.12.2008

Time: 9:05:36

Sensor: Sensor 1, (sensor type 1 (dome cover), index 1)

Status: 1 (active)

Online event data

The data stored in the logbook corresponds to that of the offline events. Where available, the current GPS data is also saved. This data is identified as online data.

Example:

SI:151208-103322 M:ON I:10(2-1) S:1(pas)

Online sensor event

Date: 12.12.2008

Time: 10:33:22

Sensor: Sensor 10, (sensor type 2 (API coupling), index 1)

Status: 1 (passive)

Status information

Immediately after switching on, the current statuses of all sensor inputs are detected and saved in the logbook.

Example:

SISat: 01-----12---0---0

SIIIdx: 11-----22---5---7

Sensor 1, 2: „Dome cover“ (1)

Sensor 10, 11: „API coupling“ (2)

Sensor 15: „Cabinet door left“ (5)

Sensor 20: „Handbrake“ (7)

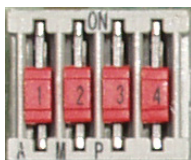


It is possible to output a special event report via the print menu (parameter **0.1.2**) which contains only the sensor events.

9.13.2 Configuration of the device

9.13.2.1 Sensor interface

The sensor interface is configured via its DIP switches.



DIP switch	Function
1	Node Number
2	Node Number
3	Reset
4	Monitoring without ext. power supply

• Node Number

DIP 1	DIP 2	Node Number
OFF	OFF	6
ON	OFF	7
OFF	ON	8
ON	ON	9

- **Reset**

DIP 3	Function
OFF	No reset
ON	Reset after power on

- **Monitoring without external power supply**

DIP 4	Function
OFF	Monitoring not possible
ON	Monitoring possible



The software is integrated into the used microcontroller. Should it be necessary to replace the microcontroller, switch off the power supply from the internal batteries. To do this, switch the DIP switch DIP 4 to "OFF"!

9.13.2.2 MultiFlow



The basic parameters for configuration of the sensor module are compiled under the menu item **3.1.6.9**.



The sensors are divided into group sensors and individual sensors. Individual sensors comprise only one sensor each whereas group sensors comprise varying numbers of sensors depending on the application. The size of such a sensor group is determined by the "Compartment number" parameter (**3.1.6.9.3**).

Group sensors	Individual sensors
Dome cover	Cabinet door left
API coupling	Cabinet door right
Foot valve	Handbrake
In-line valve	

Example:

A specified compartment number of "3" means that e.g. up to 3 dome cover sensors can be used, however only one handbrake sensor is supported.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9	Sensor interface				
3.1.6.9.1	Use SI	S/M	2	0 (no)	Activation of the optional sensor module
3.1.6.9.2	SI node	S/M	2	0	Node number of sensor module when activated.
3.1.6.9.3	Compartment number	S/M	2	1	Number of compartments to monitor. (1 .. 20)
3.1.6.9.4	Request interval		2	60s	Average request interval without connecting external power supply. (0 .. 21600s)
3.1.6.9.5	Transmission delay	S/M	2	50ms	Interface-end telegram delay on CAN bus. (0 .. 255ms)
3.1.6.9.6	Trigger interval	S/M	2	5s	Interval before watchdog is triggered (inactivity detection). (0 .. 60)

- **Use SI**

This parameter is used to activate the sensor interface support. If this parameter is set to '0' there is no sensor interface control.

- **SI node**

The CAN bus node numbers via which the sensor interface can be addressed.

- **Compartment number**

Number of compartments on the vehicle. Used to define the number of group sensors to be used.

- **Request interval**

This parameter determines the intervals at which the sensors should be monitored by the sensor interface in offline mode. This is an average value. The precise monitoring interval varies for safety reasons to different degrees above and below the specified value.

- **Transmission delay**

Adjustable transmission delay of the sensor interface when transferring several CAN telegrams. You should always consult the manufacturer before changing this parameter.

- **Trigger interval**

Determines the interval for inactivity monitoring of the sensor interface. Special CAN telegrams must be sent to the sensor interface within this period in order to continue to operate in online mode. If there are several “communication-friendly” devices connected to the CAN bus you can increase the trigger interval for the sensor interface.

- **Extended parameter protection**

If this parameter is activated, all sensor interface settings are under seal protection and can only be changed when the W&M seal is broken. If the parameter is deactivated, the parameters are protected only by the master password.



All parameters for the configuration of the sensor-interface are protected by the master password when the “Extended parameter protection” is deactivated.

9.13.3 Configuration of the sensors



The configuration of all the sensors takes place in the same way and is stored under parameter **3.1.6.9.7**. There is a predefined selection of different sensor positions. As described, this relates either to individual sensors (e.g. “Cabinet door right”) or to whole sensor groups (e.g. “Dome cover”). The size of these sensor groups is defined using the “Compartment number” parameter (**3.1.6.9.3**).

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9.7	Sensors				
3.1.6.9.7.1	Dome cover	S/M			
3.1.6.9.7.1.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.1.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.1.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.2	API coupling	S/M			
3.1.6.9.7.2.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.2.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.2.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.2.4	Delay time	M	2	0s	Delay time for detecting a status change during delivery
3.1.6.9.7.3	Foot valve	S/M			
3.1.6.9.7.3.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.3.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.3.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9.7.4	In-line valve	S/M			
3.1.6.9.7.4.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.4.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.4.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.5	Cabinet door left	S/M			
3.1.6.9.7.5.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.5.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.5.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.6	Cabinet door right	S/M			
3.1.6.9.7.6.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.6.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.6.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.7	Handbrake	S/M			
3.1.6.9.7.7.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.7.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.7.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.8	Ext. parameter protection	S/M	2	0 (no)	Activates extended parameter protection. When active, sensor interface parameters can be changed only when the electronic seal is broken.

- **Start sensor group**

Group sensors and individual sensors are supported. In the case of sensor groups, only the input number of the first sensor of each group is specified. E.g. if a compartment number of “3” is specified, up to 3 dome cover sensors are supported. A “Start sensor pos.” of “1” thus means that the sensors connected to the sensor-inputs 1..3 are treated as dome cover sensors. However individual sensors such as handbrake or cabinet door sensors are allocated only one input each.

- **Sensor type**

There are 4 different sensor types to choose from:

1. Digital NC contact
2. Digital NO contact
3. Namur NC contact
4. Namur NO contact


- **Alarm event**


Using this menu item specify whether, in the event of a detected change of a sensor input in addition to the entries generated in the logbook and the event section of the start screen the output of a user-acknowledged alarm message to the MultiFlow display is required.

9.13.4 Sensor monitor

Connecting the sensor module allows the functions of the MultiFlow to be enhanced by a rudimentary sensor monitor.

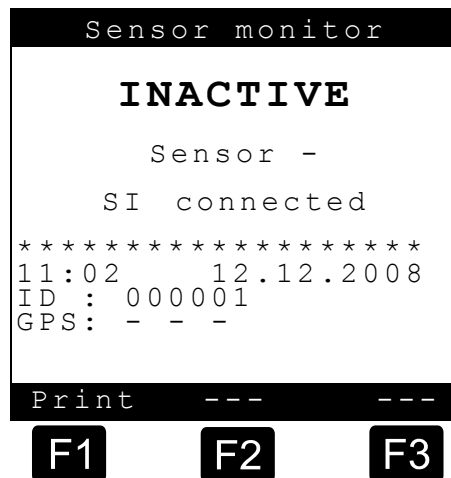
No.	Name	Seal	K	Factory Setting	Meaning
4.8	Sensor monitor				Can only be selected when the connection to the sensor interface is active.
4.8.1	Activation	M		0 (no)	(De) activates the sensor monitor. Time and (where available) GPS position are saved. Monitor remains active until a sensor status change with an activated alarm message is detected.
4.8.2	Status	D			Display of current monitor status
4.8.3	Printing	D			Printout of the sensor monitor status report

 All available sensor monitor parameters are compiled under menu item **4.8**. The **4.8.1** "Activation" menu item is used to (de)activate the sensor monitor. This parameter is protected by the master password. The date and time are saved when the monitor is (de)activated. The current GPS coordinates are also saved if the MultiFlow is connected to a GPS-compatible EMIS via the CAN bus.

 The current status of the sensor monitor can be checked using parameter **4.8.2**. As well as the current monitoring status, it shows the status of the connection to the sensor interface, the time and date and the GPS data (if available) at the time of the (de)activation. You can also use the F1 key to request a status report to be sent to the printer. See also chapter 11.10 "**Sensor monitor status report**" / page 233.

Sensor monitor status

- ▶ A message appears in the event section of the start screen as soon as the sensor monitor is (de)activated. This is always displayed after switching on to inform the user if the sensor monitor is active.



- ☐ The sensor monitor takes into account only those sensors whose “Alarm event” parameter is set to “1”. Changes to sensors for which the alarm event is not activated do not interrupt monitoring!
- ☐ If a change is detected to one of the monitored sensors and the monitor is active, the sensor monitoring is halted. The time and date and GPS data (if available) at the time of the event are stored. The status display and status printout based on this information enable precise determination of when and possibly where the seal was broken. Information is also given about how the deactivation was triggered. This can be caused by the change in status of a sensor with activated alarm message (“-Sensor-”) or manually by the user (“-Manual-”, **menu 4.8.1**).
- ☐ An EMIS with a GPS function, if used, detects the current GPS coordinates using the connected GPS receiver. This data is made available to the other system units via the CAN bus. If no GPS data is available, the EMIS supplies the last valid GPS data received. The user is shown whether the GPS coordinates displayed are those received at the time of the (de)activation or the most recent valid data. A “-C-” indicates that GPS data was available at the time of the (de)activation, while an “-L-” indicates that no GPS data was received at the time and this is the most recent valid GPS position.
- ☐ A monitoring ID is specified in addition to the time, date and GPS coordinates. This is a consecutive number which increases by one every time the sensor monitor is activated. It is stored in the non-volatile MultiFlow memory and can be set to 0 in a device reset via parameter **4.4**.



Example of a conversion of the coordinates into a format supported by Google Maps N.5338.54642 , E.953.37069 -> +53°38.54642, +09°53.37069



The "Alarm event" parameter of the respective sensor must be set for the sensor monitoring.



The monitoring ID is a consecutive number. It is set to zero only after a reset (versions **5.01** and earlier: menu **4.4**, versions **5.02** and later: menu **4.4.1**).



The GPS position can only be given when the MultiFlow is operating with a GPS-compatible EMIS.

9.14 IO Interface - MFIO2

Parts no.: **MFIO2**

Drawing no.: 51.352180 / S. 343

Circuit diagram no: 51.352197 / S. 344

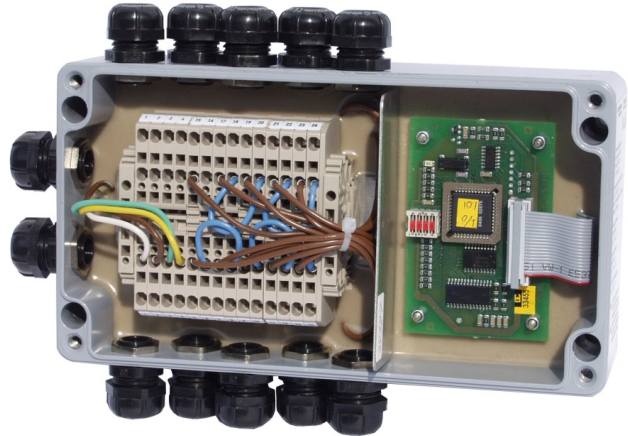


Fig. 4 : IO interface – MFIO2



The connection of the IO interface to the MultiFlow allows the use of an additional 8 outputs and 2 inputs. The IO interface is connected to the MultiFlow via the external CAN bus.







The connection of the IO interface enables users to generate specific in- and output links. Additional hose paths can also be defined via the freely configurable outputs.

9.14.1 IO Interface Functional Description - MFIO2






The IO interface can be configured from each MultiFlow. It is configured according to the specifications directly after the MultiFlow turn-on and is then ready for operation. The user is notified about the respective connection status of the IO module in the event section of the start screen.

-  The IO interface has an inactivity monitor. For this purpose, special TMC telegrams must be sent at regular intervals from the MultiFlow via the CAN bus to the IO interface. If these telegrams are not sent, for instance due to a break in the connection, the device automatically switches to offline mode. The output statuses in this case assume the default statuses.
-  Up to 8 solenoid valves can be controlled from the I/O interface. The I/O interface is also equipped with two not-intrinsically safe inputs.
-  Output circuit $U_{\max} \leq 24V, I_{\max} \leq 1A$
-  Input circuit $U_{\max} \leq 24V, I_{\max} \leq 1A$




In the case of multiple measuring systems you need to ensure that the active MultiFlows are not accessing the same IO interface.

9.14.1.1 Link

-  Each output of the external IO interface can be linked to any input or output of the MultiFlow plus one of the two inputs of the IO module (IN1 and IN2). The corresponding output of the IO interface assumes the status of the respectively allocated input or output.
-  It is also possible to specify a delay time. After recognizing a status change of the reference-in/output the status of the linked external output is adjusted after this delay time. The delay time can be set in 100 msec increments from 0 to 10 sec.
-  Furthermore an inversion of the output status can be specified. In this case the external output always assumes the inverted status of the input or output with which it is linked.

9.14.1.2 Additional hose path

-  Alternatively to the in/output-link it is possible to use the external outputs to control an additional hose path. The hose path name can be specified by the user, bearing in mind that different entries cannot have the same name. This name is displayed in addition to the existing hose paths in the hose path choice displayed before each delivery. If the corresponding hose path is selected here, the delivery is controlled not via the local outputs but via the respective external output. The additional hose paths cannot be selected if the IO expansion is incorrectly connected to the MultiFlow or the connection is damaged.

- ☐ The additional hose paths must be entered in the hose approval. Abbreviations '1'..'8' apply here. '1' indicates in this case that the hose path associated with the external output 1 should be used for delivery.

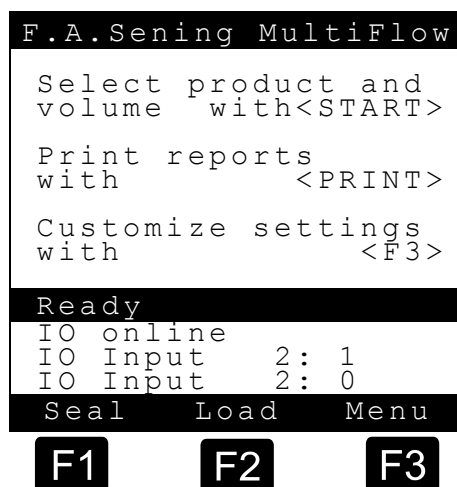


Parameters for the additional hose path specification are subject to calibration protection. To change the parameters, the electronic seal must be broken.

9.14.1.3 Idle operation

- ☐ If the IO interface is operated without an active link and without assignment of an additional hose routing, the MultiFlow only monitors the two inputs (IN1 and IN2). Modifications to the inputs are displayed on the Info area of the MultiFlow homepage screen and are also recorded in the logbook. In cases where the MultiFlow unit is operated with a GPS-capable EMIS, the corresponding location details are also recorded in the logbook.

Start screen



9.14.2 Configuration of the device

9.14.2.1 IO Interface

The IO interface is configured via its DIP switches.



DIP switch	Function
1	Node Number
2	Node Number
3	No function
4	No function

- **Node Number**

DIP 1	DIP 2	Node Number
OFF	OFF	16
ON	OFF	17
OFF	ON	18
ON	ON	19

9.14.2.2 MultiFlow

The basic parameters for configuration of the IO module are compiled under the menu item **3.1.6.0**.

No.	Name	Seal	K	Factory setting	Meaning
3.1.6.0	IO interface				
3.1.6.0.1	Use IO	M	2	0 (no)	Activation of the optional IO expansion
3.1.6.0.2	IO node	M	2	0	Node number of the IO expansion, if the latter has been activated.
3.1.6.0.3	Transmission delay	M	2	50ms	Interface-end telegram delay on CAN bus. (0 .. 250ms)
3.1.6.0.4	Outputs	M	2		Configuration of the individual outputs

- **Use IO**

This parameter is used to activate the IO interface support. If this parameter is set to '0' there is no IO interface control.

- **IO node**

This relates to the CAN bus node numbers via which the IO interface can be addressed.

- **Transmission delay**

Adjustable transmission delay of the IO interface when transferring several CAN telegrams. You should always consult the manufacturer before changing this parameter.



All parameters for the configuration of the IO module which are not used for the additional hose path specification are protected by the master password.

9.14.3 Configuration of the outputs

The IO module has 8 outputs and 2 inputs. The outputs are configured via the parameters compiled under menu item **3.1.6.0.4**.

Selection of the output



The specified parameters are identical for all outputs. An output can be linked either with an output/input or used to control an additional hose path.

Outputs	
Selection : 31604	
1	Output 1
2	Output 2
3	Output 3
4	Output 4
5	Output 5
6	Output 6
7	Output 7
8	Output 8
Forward Back ---	
F1	F2 F3

No.	Name	Seal	K	Factory setting	Meaning
3.1.6.0.4	Outputs				
3.1.6.0.4.x	Output x				
3.1.6.0.4.x.1	Link				
3.1.6.0.4.x.1.1	output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.x.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.x.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.x.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.x.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.x.2	Additional hose path				
3.1.6.0.4.x.2.1	Use	S	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.x.2.2	Designation	S	2		Designation of the additional hose path

9.14.3.1 Linking the outputs



The necessary parameters for the logical linking of the IO module outputs are compiled under menu item **3.1.6.0.4.x.1**. The corresponding configuration is to be carried out separately for each output.

- Output**

Determines whether the related output should be linked with an output, i.e. the status of the external output follows the status of the linked output. Valid pre-settings in this case are "0, 1 .. 7", where "1"

to "7" correspond to the respective local output of the MultiFlow. Setting '0' determines that no output link is used for this output.

- **Input**

Determines whether the related output should be linked with an input, i.e. the status of the external output follows the status of the linked input. Valid pre-settings in this case are "0, 1 .. 4, 5 .. 6", where "1" to "4" corresponds to the respective local input of the MultiFlow. "5" and "6" are used to address the IO module inputs "IN1" and "IN2" and '0' determines that no input link is used for this output.

- **Delay time**

These parameters are used to determine whether the status of the external output follows the status of the linked in/output immediately or with a pre-set delay (0, 0.1.. 10sec).

- **Inversion**

Determines whether the status of the linked in/output should be inverted at the external output.

- **Product dependency**

The product dependency of the link is defined by this item. Up to 5 dependencies can be defined. For this purpose it is necessary to specify the index of the respective product according to the product list (**3.5.x.x**) (e.g. heating oil = 11). Selecting "0" deactivates the product dependency. The product dependency determines whether the according link is active during each delivery ("0") or only during the delivery of the defined product. Product dependency only applies to the delivery process. During the MultiFlow's idle status link control this parameter is not considered.



Since the outputs assume the default statuses when a connection is broken, the configuration of product-dependent links should take into account the fact that the idle status of the corresponding output needs to correspond to the default idle status.

9.14.3.2 Additional hose path



The parameters required to control an additional hose path are found under menu item **3.1.6.0.4.x.2**. The corresponding configuration is to be carried out separately for each output.

- **Use hose path**

It is possible to specify a further hose path. This parameter is used to determine that the related output should be used to select an additional hose path. This hose path must be added to the hose approval (parameter **3.1.8.7**). Once done, it is displayed in the hose path selection before a delivery.

- **Hose path designation**

The user can specify any name for the unique identification of the additional hose path. The same name cannot be used for different pre-settings.



The additional hose path must be added to the hose approval (parameter **3.1.8.7**) to enable it to be displayed in the hose path selection options at the start of delivery. When using the IO module the existing abbreviations for the hose approval are extended by the abbreviations "1 .. 8".

Selection: 31604822		
Designation		
Hose path 8		
Text		
Confirm entry by pressing <PRINT>		
Discard entry by pressing <STOP>		
New	Del	=>
F1	F2	F3



These indicate respectively the external output which should be used to control the additional hose path. '8' means in this case that the hose path associated with the external output 8 should be enabled.

Selection		
Hose approval		
>UVPSB8 <		
Available hoses		
Small	Del	---
F1	F2	F3

Press START to
continue

Selection:

1 Unmeasured
2 Wet hose
3 Dry hose (P)
4 Dry hose (S)
5 Bypass
6 Hose path 8

Forward Back ---

F1 F2 F3




Parameters for the additional hose path specification are subject to calibration protection. To change the parameters, the electronic seal must be broken.



It is not permitted to use a hose path name a second time.

10 Form Description

-  The operation of a flow computer demands a range of forms. In particular, the invoice form is subject to individual user requirements and must therefore be capable of flexible arrangement.





A form is described by a string of form elements. A form element is composed of the following fields:

Field	Meaning
ID	Element type
X, Y	Position in the form in mm or columns and lines.
Attributes	Display features
Options	Conditions for application
Format	Multi-purpose field, formatting information



The choice of whether the position details are to be defined in millimetres or in columns and lines, is specified via parameter **3.2.5** (Units X/Y).

10.1 Defining a Receipt (Delivery Receipt or Invoice)

-  The main problem when defining a delivery receipt is usually the positioning of text in fields which are already printed on the receipt. Furthermore, the printout should also be able to be arranged in a variable manner with regard to the character layout, for example, to highlight certain text and so to layout the printout with regard to size and width, etc. Apart from ready-defined text modules, there should also be the possibility of defining one's own text.
-  To fulfill all these requirements the definition of the form element positions can be made in **characters** or in **mm**. For the normal receipt the definition of the positions in characters is completely adequate with the **spacing** (parameter **3.2.5**) being set to 1.
-  The definition of the spacing in mm is only practicably applicable with a DIN A4 printer. It is then possible to print text in the intended fields with an accuracy of 1 mm, e.g. the date in the date field, the delivery receipt number in the delivery receipt field, etc.
-  To define the character layout, attributes are introduced with which the font size and width can be set individually. In addition, the conditions under which the text is to be printed can also be defined. The printout

"COPY" should not, for example, appear on the original receipt. Correspondingly, the option 'K' is provided for the text field "COPY".

- ☐ An example of the applications for the various attributes is described in the following.

10.1.1 W & M Requirements

The definition of the delivery note is divided in two sections: the section subject to W & M regulations and the other one not subject to W & M regulations.

- ☐ During calibration a minimum layout requirement is defined in parameter **3.1.3.4**, enabling the changing of the delivery note after calibration. The delivery note elements required in Germany are factory-set. Printing of the required text elements is **mandatory** on any delivery note and any invoice (W & M requirement).
- ☐ After any change made in the delivery note definition the MultiFlow checks whether these mandatory text elements are available. In case a text element is found missing, an error message appears on the screen. Only when all required text elements are available in the delivery note definition, the delivery note can be changed and adapted. This procedure ensures that no parameter required by W & M regulations is omitted in the delivery note definition. **Additional amendments to the delivery note definition** can thus be made without breaking the W & M seal.

10.1.2 Entry Dialogue

- ☞ The form entry dialogue enables the user to change, delete and insert into the list of elements which describe a form.

Standard Receipt	
ID	(2:22) : 1
String	
Line	: 20
Column	: 10
Attributes	: N
Options	: D
Format: DELIVERY NOTE	
New	Clear ==>
F1	F2 F3

The following keys are used to control the list:

F1	Create and insert a new element
F2	Delete displayed element
F3	Display next element
Enter	Edit element
Stop	Terminate editing of form, cancel all changes after confirmation by the user
Print	Terminate editing of form

The field to be edited is identified in pointed brackets > <:

Active Entry Field →

Standard Receipt		
ID	:	1 (2:22)
String		
Line	:	>20 <
Column	:	10
Attributes	:	N
Options	:	D
Format: DELIVERY NOTES		
New	Clear	---
F1	F2	F3


The following key assignment applies when editing:

F1	Shift between upper and lower case characters
F2	Deletes the character to the left of the cursor.
F3	When active: Selects the language with multilingual text.
Enter	Save entry, continue with the next entry field.
Stop	Cancel dialogue, restore old values, close mask.
Print	Close dialogue, save all entries.



The defined receipt layout can be printed and checked in the reports menu (**PRINT**).

10.1.2.1 Positioning on the Receipt

 To position the texts on the receipt the X and Y positions must be defined first. This position is then used as the reference point for all other definitions.

3
GHI

4
JKL

1
ABC

Print

2
DEF

3
GHI


As the first step, check the setting for the **spacing**. For a standard delivery receipt definition the spacing should always be set to 1 character.


The entry is confirmed with **<Print>**.


Next, the columns for the actual printout are defined. This specifies how much space is to be maintained at the left margin of the page.

The figure for the **lines before printout** gives the distance to the upper page margin. No text is printed in this section.

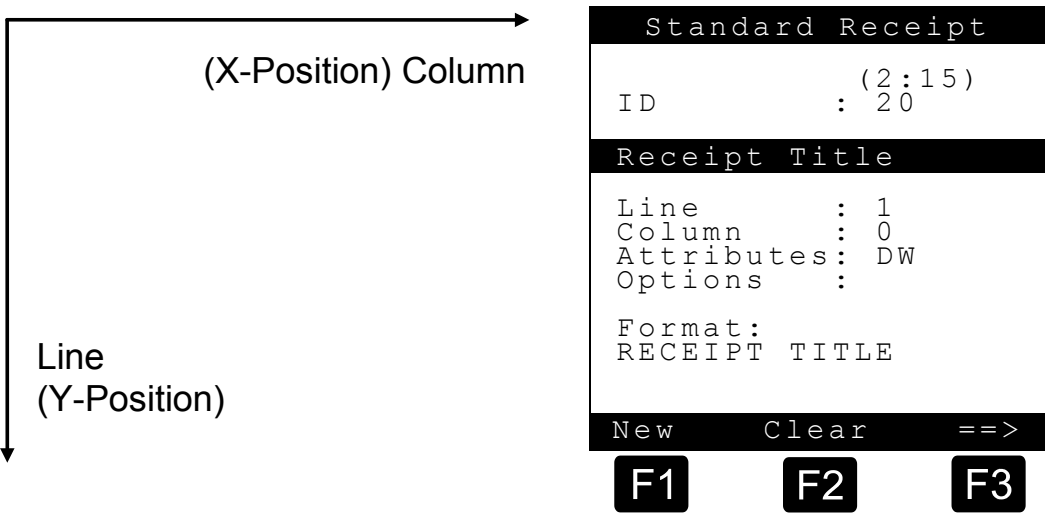
 See chapter 10 "Form Description" / page 190.

 When the menu 3.4.4 "Receipt Layout" is selected, the receipt header coded "0" appears. In future you will be able to define various receipts, currently only the standard receipt is defined. This setting cannot be changed.

 Use the **<F3>** key "**= = >**" to display the first defined form element.



The various form elements are displayed in the same order as they are printed on the receipt.



The text **"Receipt Title"** in above mask serves as a placeholder for the receipt title, the ID of which is '20'. You define the print position on the receipt by entering line and column.



Add a new receipt definition with <F1> **"NEW"**.



The default setting is ID 1 "string of characters".

- From the summary of text elements (modules) (see chapter 10.1.3 "Summary of Text Modules " / page 195) you can now choose a pre-defined text module (form element), or you can enter the required text to the form display.



Press the <Enter> key to start processing the text element.



With the blinking cursor you are asked to enter the "ID".



Enter the ID of the required text element and press <Enter>.



Now definition of the **"Line"** is required.



Enter the required line position at which the text is to be printed.

- Enter the **"Column"**.



Now the positioning of the text on the receipt is completed.



With **"Attributes"** and **"Options"** you can define the form and possible options for the printout.

10.1.2.2 Form modification After Sealing



After the MultiFlow has been sealed the parts of the form description relevant for calibration are secured against manipulation. This means that those form elements listed in the minimum requirements (parameter 3.1.5.4) are specially monitored.

- The MultiFlow prevents the formatting or the options for these elements from being changed. The position and attributes of these elements however remain variable.



See chapter 10 **"Form Description"** / page 190.

10.1.2.3 Example of a Receipt

The example of a receipt illustrated below shows how the receipt definition must be carried out.

Invoice	
Meter no.:	PI-ME 97
Receipt no.:	001275
Delivery date:	01.12.97
Start of discharge:	10:45:30
End of discharge:	10.48:55
Customer ID.:	000000
* Heating oil *	
*Amount at 15 Cel 228 L	
*	
*w. VAT: 87.65£ /100L = 199.84 £ *	
Additive (0.5L) 1 pc.	
w. VAT: 23.45£ / pc. = 23.45 £	
Total net	194.16 £
VAT 15.00 % 194.16	29,13 £
Total gross 223.29 £	

Signed	
You've been served	
by: C. Anyone	

10.1.3 Summary of Text Modules



In order to obtain an overview of which elements (modules) are available for the definition of the receipt, a summary can be printed with the function **"Form elements"** (menu 3.4.6). The attributes supported by the connected printer are also shown in the printout.

The example shown was produced by a DR-295 printer. From the table it can also be seen that not all the attributes are supported by the DR-295.

Example of a text module print-out:

--

Form Element List	Attr	Opt

0 Header		
1 Litral		
2 Meter ID :#20#		
3 Receipt ID :#20#		
4 Customer ID :#20#		
5 Driver ID :#20#		
6 Date :#20#		
7 Time :#20#		
8 Deliv. Date :#20#		
9 Deliv. Start :#20#		
10 Deliv. End :#20#		
11 PRODUCT BLOCK 1	D	
12 PRODUCT BLOCK 2		
13 PRODUCT BLOCK 3		
14 SUM BLOCK 1	D	R
15 SUM BLOCK 2	D	R
16 SUM BLOCK 3	D	R
17 UNDEFINED		
18 Driver's name: #1#		
19 Meter before start:	D	
20 RECEIPT TITLE	DW	
21 INVOICE	DW	R
22 DELIVERY NOTE	DW	L
23 ZERO RECEIPT	DW	L
24 W & M RECEIPT	DW	L
25 (COPY)	B	K
26 W&M-REMARK	2	
27 SEAL-ALERT	2	X
28 UNDEFINED		
29 UNDEFINED		
30 PRODUCT BLOCK 4	D	
31 Transfer-Remark	B	PS
32 Selected Hose :#18#		
33 Average Flow :#18#		
50 Drop line start		
51 Drop line end		
54 Product name		
55 Drop volume		
56 Measurement unit		
57 Average temperature		
58 Average density		
59 Drop mode (short)		
60 Drop mode (long)		
61 Total Start VT		
62 Total Start V0		
63 Total Start Masse		
64 Total Start Add		
65 Total End VT		
66 Total End V0		
67 Total End Mass		
68 Total End Add		

Minimal Layout : 2,3,(11:12),25		
+		

Attributes marked with an 'X' are supported:

```

Att 220 295 298 570 FX ASCII

B X - X X X - ABCabc123
C - - - X X - ABCabc123
I - - (X) X X - ABCabc123
U X X X X X - ABCabc123
H - - - X X - ABCabc123
L - - - X X - ABCabc123
S - - - X (X) - ABCabc123
R X - - - - ABCabc123

D X X X X (X) - ABCabc123
W X X X X X - ABCabc
1 X X X X X - ABCabc123
2 X X X X X - ABCabc123

DW X X X X X - ABCabc
ZW X X X X X - ABCabc
2WU X X X X X - ABCabc

--Ausdruck--Ende--

```

10.1.3.1 Description of Text Modules

ID	Output	Name	Remarks
0		Form header	This element is contained in each form; it acts as 'anchor' for all user-defined elements. This element does not appear on the receipt.
1	<Any text>	String, Literal, Text	Text element, defined by operator
2*	Meter ID: 123456	Device ID	Device Identification
3*	Receipt ID: 123456	Receipt ID	
4	Customer ID.: 123456	Customer ID	
5	Driver ID.: 123456	Driver ID	
6	Date: dd.mm.(YY) yy	Date	Current date
7	Time: ss:mm(:ss)	Time	Current time
8	Deliv. date: dd.mm.(YY) yy	Delivery date	Date at start of discharge
9	Start of discharge: ss:mm(:ss)	Discharge start time	

ID	Output	Name	Remarks
10	End of discharge: ss:mm (:ss)	Discharge end time	
11 *	Product name Volume at nn Cel XXXXXXXX L w. VAT: 12.34£ /100L = YYYYY.YY £ Product name At discharge temperature XXXXXXXX L w. VAT: 12.34£ /100L = YYYYY.YY £ Product name XXXXXXXX Pc. w. VAT: 12.34£ /100pc = YYYYY.YY £	Product block #1	Contains product name and code, discharge volume and type, gross and net prices only on invoice. Figures about compensation may vary! After enabling the option „W“, the compensated product weight is also shown in the product block.
12 *	Product name Volume at nn Cel XXXXXXXX L At discharge temperature XXXXXXXX L w. VAT: 12.34£ /100L = YYYYY.YY £	Product block #2	Printing of volumes VT and V15 is subject to setting the product parameter 3.5.nn.7.1 . See chapter 9.10 " Product Registers (35nn..) " / page 162. After enabling the option „W“, the compensated product weight is also shown in the product block.
13 *	(see ID # 11)	Product block #3	Price line also on delivery note After enabling the option „W“, the compensated product weight is also shown in the product block.
14	Total net 12345.67 £ VAT 12.34% 1234.56 12345.67 £ Total gross 12345.67 £	Sum block #1	Contains net sum, taxes, gross sum
15	Total net 12345.67 £ VAT 12.34% 1234.56 12345.67 £ Total gross 12345.67 £ At exchange rate 1.23456 Total gross xxxxxxxx EUR	Sum block #2	Same as sum block #1, however stating both currencies.
16	Total net 12345.67 £ VAT 12.34% 1234.56 12345.67 £ Total gross 12345.67 £ Total gross xxxxxxxx EUR	Sum block #3	Same as sum block #2, but without stating the exchange rate.
17		Free	Not defined.
18	Driver's name: xxxxxxxxxxxxxxxxxxxxxxxx	Driver's name	Driver's name from driver table.
19	Meter before start: 0 L	Meter reading	Meter reading before the discharge (appears on zero receipt).
20	RECEIPT TITLE	Receipt title	Combines the fields 21-24 and 28 - 29; differentiated positioning is not possible.
21	INVOICE	Text: Invoice	Predefined text element (only appears on invoices).
22	DELIVERY NOTE	Text: Delivery note	Predefined text element (only appears on delivery notes).
23	ZERO RECEIPT	Text: Zero receipt	Predefined text element (only appears on zero receipts).
24	W & M RECEIPT	Text: Calibration	Predefined text element (only appears on calibration receipts).
25 *	COPY	Text: Copy	Predefined text element (only appears on copies).

ID	Output	Name	Remarks
26	Data from calibrated parts of the device are enclosed by *.	Cal. Remark	Standard text for printouts made on forms not bearing the compulsory remark.
27	Seal broken! No responsibility accepted for any values measured.	Seal Alarm	Standard text used whenever the seal is broken.
28 **	PRODUCT TRANSFER	Text: Prod. Transf.	Predefined text element (only appears on transfer forms).
29 **	SELF LOADING	Text: Self Loading	Predefined text element (only appears on self loading forms).
30 *	(see ID # 11)	Product block 4	(see ID # 11); the positions of "Discharge type" and "Product name" are exchanged. After enabling the option „W“, the compensated product weight is also shown in the product block.
31 **	Only for internal use, Not Authorised for Trade Use!	Transfer Remark	Predefined text element (only appears on self loading and product transfer forms).
32	Selected Hose : XXXXXXXXXXXXXXXX	Hose Path	When the electronic hose selection is being used, the hose path used is printed out; if more than one discharge per receipt is allowed, then a table is printed out with the hose paths for all discharges.
33	Average Flow: XXXX L/min	Average Flow Rate	Average flow rate during the discharge (i.e. downtime periods / discharge interruptions are not taken into account); if more than one discharge per receipt is allowed, then a table is printed out with the average flow rates for all discharges.
35	Compartment no.:	Compartment number	When automatic query of the compartment number is activated, the compartment number specified in the discharge preset is printed out.
36	Discharge preset:	Discharge preset	The discharge volume specified in the discharge preset is printed out.
37	Order no.:	Order number	When the order number query is activated, the order number specified in the discharge preset is printed out.
50		Discharge line start	Identifies the beginning of a record line
51		Discharge line end	Identifies the end of a record line
52		Free	
53		Free	
54		Product name	
55	nnnnnnn (.mm)	Discharge volume	Formatting dependent on equipment setting and regulations
56		Unit of measurement	
57	+nn (.m °C)	Average temperature	
58	nnn (.m kg/m3)	Average density	
59	xx	Delivery mode (short)	"VT" or reference temperature in °C

ID	Output	Name	Remarks
60	At the drop temperature or, if compensated volume at nn °C	Delivery mode (long)	
61	nnnnnnnn L	Total Start VT	Totalizer Reading for VT before start of the first discharge
62	nnnnnnnn L	Total Start V0	Totalizer Reading for V0 before start of the first discharge
63	nnnnnnnn Kg	Total Start Mass	Totalizer Reading for Mass before start of the first discharge
64	nnnnnnnn L	Total Start Add	Totalizer Reading for Additive before start of the first discharge
65	nnnnnnnn L	Total End VT	Totalizer Reading for VT after the last discharge
66	nnnnnnnn L	Total End V0	Totalizer Reading for V0 after the last discharge
67	nnnnnnnn Kg	Total End Mass	Totalizer Reading for Mass after the last discharge
68	nnnnnnnn L	Total End Add	Totalizer Reading for Additive after the last discharge
69	Total ex. VAT 12345.67 EUR	Total ex VAT	Net total price of discharge
70	VAT 12.34% 1234.56 12345.67 EUR	Rate of tax	Total tax for discharge
71	Total incl. VAT 12345.67 EUR	Total with VAT	Gross total price for discharge
72	With exchange rate 1.23456	With exchange rate	Exchange rate
73	Total gross 12345.67 DM	Total gross	Gross total price for discharge in second currency

- Elements marked by an (*) are subject to W & M regulations. When saving the layout and before each delivery a test is made of whether the necessary elements are contained in the form (see parameter **3.1.5.4**, minimal layout).
- Elements marked with (**) are only used with certain software features.
- If forms are used which have the required text printed in, the element "26" may be omitted.

10.1.3.2 Placeholders



Placeholders are provided for values which are only produced during the printout (e.g. time, date, discharged amount). The placeholders are set between '#' characters and the figure indicates the number of characters reserved for formatting.



For example, six characters (#6#) are provided for the meter number. The delivery date can be regarded as a special case. Eight characters are sufficient for the short form without the century figure. However, if the century is to be printed, then a placeholder for minimum 10 characters must be provided.



The length of the placeholder always determines the **minimum** space to be reserved. If the output requires more space, the setting is ignored. The actual value is always placed aligned to the right in the reserved area.

10.1.3.3 Options



One character or a number of characters also indicate the option of when the text is to be printed. The text is only printed if the selected conditions are also fulfilled after the printing job is triggered.

The following abbreviated designations are defined:

L/D	Delivery note
R/I	Invoice
K/C	Copy
N/Z	Zero receipt
V	Electronic seal verified
X	Electronic seal (soft seal) broken
P	Product transfer between single compartments of a truck
S	Self-loading
W	Only available for the product block! Adds the product weight to the product information.

Example:

- 'LK': The text with this option is only printed on copies of delivery notes.
- 'X': A text with this option is only printed when the electronic seal is broken.



Option "K" is not supported by document elements 69 – 73.

10.1.3.4 Attributes



A range of attributes are made available to the user for individual receipt layout. The selection of the available attributes is limited here by the possibilities offered by the printer used.

The effect of the various attributes can be seen in the summary (chapter 10.1.3 " Summary of Text Modules " / page 195) or in a sample receipt (chapter 10.1.4 " Control Printout " / page 204).

A character string represents the attributes used (max. combination of 3):

Attribute	Explanation	TM-U220	DR-295	DR-298	Tally printer	FX	ASCII
B	Bold	yes	-	yes	yes	yes	-
C	Condensed	-	-		yes	yes	-
I	Italic	-	-	(yes) ⁺	yes	yes	-
U	Underlined	yes	yes	yes	yes	yes	-
H	Superscript	-	-	-	yes	yes	-
L	Subscript	-	-	-	yes	yes	-
S	Small	-	-	-	yes	(yes) ^{**}	-
R	Red Characters	ja	-	-	-	-	-
D	Double Height	yes	yes	yes	yes	-	-
W	Double Width	yes	yes	yes	yes	(yes) ^{**}	-
1	10 CPI (Font size 1)	yes	yes	yes	yes	yes	-
2	12 CPI (Font size 2)	yes	yes	yes	yes	yes	-

^{*)} Printing is inverted instead of italic

^{**)} Depending on the printer model used

Example: 'DWU';

The text is printed in double height, double width and underlined.

10.1.3.5 Minimum Layout



Parameter **3.1.5.1.4** (Minimum layout) lists all elements which are the minimum requirements of a receipt document definition as determined by the W&M authorities.



As a factory setting or after reset to standard the minimum layout is a follows:

- Up to program release 3.20[3.23]: '2,3,(11:12),25'.
The expression '(11:12)' means that either form no. 11 or no. 12 must be used.
- From program release 3.30[3.30]: 2,3,11,25

List of standard form elements as per minimum W&M requirement:

ID	Output	Name	Remarks
2	Meter ID: 123456	Device ID	Device Identification
3	Receipt ID: 123456	Receipt ID	
11	Product name Volume at nn Cel XXXXXXX L w. VAT: 12.34£ /100L = YYYYY.YY £ Product name At discharge temperature XXXXXXX L w. VAT: 12.34£ /100L = YYYYY.YY £ Product name XXXXXXX Pc. w. VAT: 12.34£ /100pc = YYYYY.YY £	Product block #1	Contains product name and code, discharge volume / type, gross / net prices only on invoice. Compensation details may vary!
12	'Printout of Vt and V15'	Product block #2	Both volumes Vt and V15 are printed depending on product parameter 3.5.nn.7.1 chapter 9.10 " Product Registers (35nn..) " / page 162..
25	(Copy)	Text: Copy	Predefined text element (only appears on copies!)

✍ In addition to these five elements there are other modules, e.g. date, time, driver name, etc. All available form elements are listed in section "Description of Text Modules" / p. 197 .

✍ Parameter **3.1.5.1.4** (minimum layout) is subject to calibration protection, i.e. with a sealed unit no modifications can be undertaken.

✍ The editor for configuration of the receipt layout is subject to master protection, i.e. even with a sealed unit modifications can be undertaken, taking into account the minimum layout.

✍ The minimum layout represents only a **minimum** requirement. In the receipt it is of course possible for **additional** elements to be printed at any time.

In order to ensure that the receipt layout corresponds to the current regulations (e.g. PTB-A5, chapter 5.1.3), the following procedure is required:

- Set parameter **3.1.5.1.4** (minimum layout) to the new value '2,3,11,25'.
- Exit the menu completely by pressing the **<STOP>** key a number of times. If the actual receipt layout does not correspond to the minimum layout, an indication is received of a parameter error. In this event the corresponding form element is to be corrected in the layout editor.

10.1.3.6 Sum Blocks

- ☐ The addition of sum blocks #2 and #3 (chapter 10.1.3 " Summary of Text Modules " / page 195) makes it easier to switch between two currencies (e.g. EUR and GBP).
- ☐ In the interim sum block #2 can be used to print two currencies on the receipts. Internally all prices are computed in the respective "applicable" currency (parameter **3.1.4.3.1**). However, on the invoice an additional amount (in the alternative currency) as well as the respective exchange rate may be printed.
- ☐ After the introduction of the EURO the £ has become the **alternative** currency. All prices which had been defined in the national currency before will have to be converted. Especially for the prices of liquid product it is **absolutely advisable** to use a price factor in order to keep the conversion loss small.

Example:

In Belgium prices are normally defined by factor "1", i.e. the price per liter. At the same time the exchange rate EURO to BEF is about 40. In order to keep pricing continuously precise, the price factor "100" (price per 100 liters) should be introduced.

10.1.4 Control Printout

- ☐ The layout of the receipt can be printed for test purposes to check the created receipt definition in menu 3.4.5 "**Print form**". Here, placeholders are printed for the text which is to be printed later, e.g. "Sum block" or also "Receipt title". The line and column positioning however does not differ from the actual printout.

Sample printout with placeholders:

RECEIPT TITLE	
COPY	
Meter ID	:#20#
Receipt ID	:#20#
Deliv. Date	:#20#
Deliv. Start	:#20#
Deliv. End	:#20#
Customer ID	:#20#
PRODUCT BLOCK 1	
SUM BLOCK	

Signed	
You've been served	
by: #15#	

- ▶ After the sample printout, the receipt is printed out in **descriptive form**.
- ▶ The Y position specifies the line position in **lines before printing** (parameter **3.4.3**) and the X position gives the column position in **columns before printing** (parameter **3.4.2**).

Receipt printout in descriptive form:

(341) Spacing				: Characters		
(342) Columns before printing				: 0		
(343) Lines before printing				: 0		
(344) Form descr.		Y	X	Attr	Opt	

Standard receipt	(0)	0	0			
RECEIPT TITLE	(20)	0	0	DW		
COPY	(25)	2	8	B		K
Meter ID :#20#	(2)	3	0			
Receipt ID :#20#	(3)	4	0			
Deliv. Date :#20#	(8)	5	0			
Deliv. Start :#20#	(9)	6	0			
Deliv. End :#20#	(10)	7	0			
Customer ID :#20#	(4)	8	0			
PRODUCT BLOCK 1	(11)	10	0	D		
TOTAL BLOCK	(14)	14	5	D		R
-----	(1)	25	8			
Signature	(1)	26	11			
You've been served	(1)	30	0			
by: #15#	(18)	31	0			

(X-Position) Column

Line
(Y-Position)

The descriptive text and the code (in brackets) state the text modules used (see "Description of Text Modules" / p. 197).

- ☐ Special formatting, e.g. double height, bold, underlining, etc. are specified under **Attr** (refer to " Sum Blocks " / p. 204). See also the effect of the attributes on the printout of the receipt summary.
- ☐ If nothing is specified under **Opt**, then the defined text appears on the invoice and on the delivery note (refer to "Attributes" / p. 201). If option '**D**' is entered, then a printout only occurs on the delivery note, whereas for option '**I**' the printout correspondingly only occurs on the invoice. The option '**C**' only applies to copies, i.e. the text is only printed out for a copy.
- ☐ In the module summary (see " Summary of Text Modules " / p. 195) the standard attributes and options for the printout are already specified. If the text "**Invoice**", for example, is specified with double height, double width and as **option 'I'**, the printout only occurs on an invoice.




10.2 Definition of an original delivery note (OBC operation)

Since the OBC is not included in the calibration, the measurement system must print a discharge record (the so-called original delivery note) independently (i.e. without intervention from the OBC).



This original delivery note is then placed at the beginning of the actual delivery documentation (receipt / delivery note). The positions are printed at the same time as the measurement results are transferred to the OBC.

Example of the layout of a delivery form:

Original Delivery Note					
Counter no.	Del. note	Date	Product	Discharge type	Volume
*FMC-001	004711 (K)	09.02.2000	EL heating oil	Compensated for 15°C	2374 L *
Customer address/order (short)			Signature of customer		
Supplier address / logo					
Customer address			Date Time Bill no.		
Items supplied					
Credit period			Sub-total Tax Total		
Supplier data, manager, telephone / fax nos., bank details etc.					
Payment transfer form			Customer's stub (and / or) direct debit authority		

-  The OBC is initially required to print a header, to position the printing head, and if necessary to make desired adjustments to the attributes (if not controlled by the measuring system).
-  When the discharge has been completed and the record of the measurements has been printed, the OBC can add customer information to the original delivery note so that it can easily be attributed at a later stage.
-  The purpose of the original delivery note is to obtain a confirmation of delivery (a signature) from the end customer on the "calibrated" delivery note. The driver brings this back to the office for use in accounting and the calculation of government duty. The rest of the form is retained by the customer.

10.2.1 Format

-  The original delivery note can be changed if the measurement system(s) are connected to an OBC (i.e. via an EMIS interface), i.e. the original delivery note can be adapted to the specific requirements of the tank truck operator.
-  To define the original delivery note the form editor already described is used. However, the form modules may differ from those included in the standard documentation.



The lines of the delivery note are first fully assembled and then transmitted to the printer in the FDW protocol.
The whole line is enclosed by asterisks (*).



The special format of the form layout makes it necessary to alter the compilation for the minimal layout (parameter **3.1.5.4**):

Minimal layout	:	2,3,8,25,54, 55,56,(59:60)
----------------	---	-------------------------------

For the above example the receipt definition is as follows:


(341) Step-length	:	Character			
(342) Columns before print	:	0			
(343) Lines before print	:	0			
(344) Form descr.	Y	X	Attr	Opt	

Standard receipt	(0)	0	0		
	(50)	1	0	2	
#1#	(2)	2	0		
#6#	(3)	2	17		
(K)	(25)	2	24	B	K
#10#	(8)	2	28		
#1#	(54)	2	40		
#21#	(60)	2	60		
#7.0#	(55)	2	81		
#3#	(56)	2	90		
	(51)	3	0		

(X-Position) Column

Line
(Y-Position)

10.2.2 Header

 This header (when necessary) will be printed by the OBC before it transmits the discharge orders to the measuring system(s). This considerably lightens the control load. The contents of the original delivery note lines (as described above) are adapted by the form editor to the requirements of the OBC.

10.3 Printer Settings

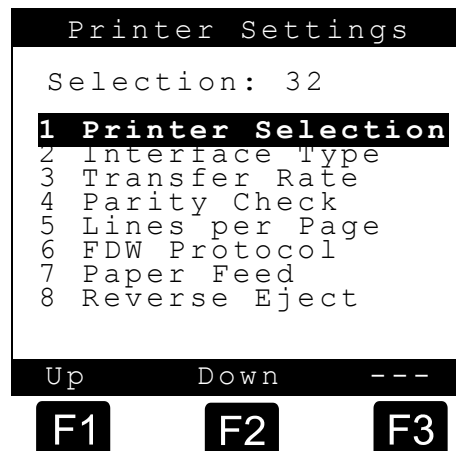
To adapt the MultiFlow to different printers, the connected printer must be parameterized.

The connected printer can be selected in menu 3.2.1 **"Printer selection"**.

Menu for Printer Settings

- ▶ After selecting the menu point, you can select the desired printer.

- ▶ To select the physical interface, in the menu point 3.2.2 "**Type of interface**" you can define a connection type **RS232** with '0' and a connection type **RS485** with '1'.



- ▶ The connector assignment for the types of interface differs and the printer interface must be wired according to the enclosed wiring diagram.
- ▶ You can select one of the **data rates** 9500 baud or 19200 baud. The DR-295 printer is normally operated with 9600 baud and the tally printer with 19200 baud.
- ▶ With the setting for the **parity check** you define whether no check ('0'), or even ('1') or odd parity ('2') is to be checked.
- ▶ The figure for **lines per page** defines after how many lines a new page is to begin. With a DIN A4 sheet of paper up to 66 lines can be printed. This figure is however restricted by the various paper transport mechanisms. With a number of 57 lines usually no writing over the edge of the page occurs.
- ▶ For a secure data transfer, you can switch the **FDW⁵-Protocol** on (1) or off (0) under selection point 6. This parameter is only available if the seal is broken.

If the FDW-Protocol is switched off and printing is required, the display will show:

"Is Printer prepared?"

Answering with "Yes" <F1> will start the printing.
Answering with "No" <F2> will display the message: "Please copy ..."

- ▶ Furthermore, you can define an **FDW timeout**. If the printer does not respond after this timeout has expired, then a **Resend** is started. With the entry under this parameter you define how often attempts should be made to output data to the printer.
- ▶ The number of data bits to be used can be set to 7 or 8 bits.



Changes to settings for parity and number of data bits must be replicated for the printer respectively in use.

⁵ TDL:Truck-Data-Link, specification available on request



If the resends are not successful within the defined number of attempts, then an error message is printed. You must then write the receipt manually.



With the DR-295 FDW the **paper feed** can alternatively occur automatically or manually using the operating panel. To achieve exact positioning of the receipt information, it is recommended to activate automatic feed (parameter **3.2.7**).

11 Printing out Reports

Each delivery is saved by the MultiFlow and can be printed out later as a report. Thus a complete shift or tour can be documented with all the events occurring on a tour or trip report.

In order to activate the print menu press the <Print> key in the ready menu on the MultiFlow.

With the reports menu which is then displayed you can select and print all the required reports.

Reports

Selection:

- 1 Short Report**
- 2 Detailed Report
- 3 Copy Receipt
- 4 Zero-Bill
- 5 Parameter List
- 6 Event Report
- 7 Office Link
- 8 (---)
- 9 (---)
- 0 Other

Up
Down

F1
F2
F3

The following reports can be called with the <Print> key:

No.	Name	Seal	K	Factory setting	Meaning
1	Short report	D			Short report over the selected reporting period. Selection possible according to time or receipt no.
2	Detailed report	D			Detailed overview over the selected reporting period. Selection possible according to time or receipt no.
3	Copy receipt	D			Reproduction of receipts according to selected receipt numbers
4	ZERO receipt	D			Receipt as proof that counter is at ZERO
5	Parameter list	D			
5.1	W & M settings	D			Only prints settings relevant to W&M requirements
5.2	All settings	D			Prints all settings.
5.3	Driver list	M			Output list of all registered drivers NOTE: The passwords for the master access are printed as well.
5.4	Form elements	D			Listing of defined form elements
5.5	Receipt layout	D			Test printout of defined receipt layout
6	Event report	M			Print extract from the log book according to selected time period
7	Office link	F			Save a trip report on the chip card
7.1	Chip card	F			Saving a trip report to a chip card.
7.2	Office transfer	F			
7.2.1	Delivery data	F			Only available in combination with an EMIS. Transfer of delivery data to the EMIS. Selection can be made according to time or receipt number.
7.2.2	Event data	F			Only available in combination with an EMIS. Transfer of selected event data to the EMIS. Selection can be time-related.
7.2.3	Sensor monitoring	F			Only available in combination with an EMIS. Transfer of selected sensor-specific data to the EMIS. Selection can be time-related.
8	Reserved				
9	Reserved				

No.	Name	Seal	K	Factory setting	Meaning
0	Other				
0.1	Sensor monitor	F			Available reports about the sensor interface
0.1.1	Status	F			Report about the current sensor monitor status. Menu item is only available when the sensor interface is active.
0.1.2	Event report	F			Print extract from the logbook in accordance with selected time frame. Contains only sensor events.
0.2	Program update				Available reports about the Program-Update (only MID)
0.2.1	Update report	F			Performed program updates (only MID)

11.1 Trip Report

- You can now select the desired receipt printouts from the menu **Detailed report**. The data that has been printed is not deleted afterwards.
- The receipt memory is organized as a ring-buffer memory with a memory depth of 192 records with a 128K card and 500 records in a 256K card. When the memory is full, the oldest records are overwritten with the new data. It is possible to reconstruct older procedures even after printing out (provided they have not already been overwritten by new data).
- To support this function, the type of printout is queried after initiating a print function. A differentiation is made between report according to time and report according to receipt.



For a report according to time:

- ▶ You enter the time period which the report is to cover. Therefore the report start time (date and time) and the report end time (also date and time) are required.
- ▶ All data occurred in this period is then printed out.



With a report according to receipt:

- ▶ You enter the start receipt number first, followed by the receipt number where the printout is to finish.
- ▶ Thus it is possible to document individual receipts. The tedious searching by date and time is no longer necessary.

11.1.1 Trip Reports on the Chip Card

An important task in the daily routine in the mineral oil business is the checking of the supplied deliveries with the billing department. For this purpose, usually duplicates of the delivery papers and of trip reports are used.

- The MultiFlow in its current version also supports a data interface for office EDP which is not dependent on the installation of electronics in the tank truck.

- All data contained in the detailed report (chapter 9.12 "**Saving Parameters on the Chip Card**" / page 168) is written to a chip card.



Do not use the *parameter chip card* for the trip report because then all parameter data on the chip will be deleted.



The trip data contained on the chip card can be processed by a number of commercially available data processing systems. We would be pleased to send you appropriate information material on request.

11.1.1.1 Saving the Trip Report

As with all other reports, the saving of the trip report is offered in the report menu.



Activate the report menu with the <Print> key.

- ▶ Now the report menu is displayed.

- ▶ Select menu point 7 "Office link".

Reports	
Selection:	
1	Short Report
2	Detailed Report
3	Copy Receipt
4	Zero Bill
5	Parameter List
6	Event Report
7	Office Link
8	(---)
9	(---)
0	Other
Up	Down ---
F1	F2 F3

- ▶ Select item 1 "Chip card".
- ▶ Now you have the choice of restricting the extent of the report by stating the receipt number range or the time period.



See also chapter 11.1 "Trip Report" / page 213 und chapter 11.3 "**Detailed Report**" / page 216.



Once the data has been

Office Link	
Selection: 7	
1	Chip Card
2	Office Transfer
Up	Down ---
F1	F2 F3

transferred, the message:
"Data transfer successful!" appears.



The last event in the report time-period is saved by the MultiFlow and is used during the next data transfer for determining the default setting for the required extent of the report.

- ▶ Now you can take the chip card out of the MultiFlow and the data can be processed by a suitable EDP system. Manual data acquisition with its attendant transfer errors is no longer needed. See 55.

11.1.1.2 Large Quantities of Data



If the gathered report data exceeds the capacity of one chip card, the remaining data can be transferred to a second card, and so on. In this case the following message appears after the data transfer:

„Chip card full! Please insert next chip card“

- ▶ Change the chip card.
 Then acknowledge the message with <F1> **“OK”**.
 ☺ The transfer is continued.







To avoid data losses, it is **essential** to change the chip card **before** acknowledging the message!

11.2 Short Report



The reports made available differ in the length of the printout and thus in their information content. With the short report only the most important data in compressed form is printed out.

Example for a Short Report:

Trip Report Report date : 20.02.2003 10:30 Meter ID : PI-ME 97 Personnel ID. : 4150 (C. Anyone) Tour start : 19.02.2003 14.39 Tour end : 20.02.2003 10:25 <table> <tr> <th>Receipt Time</th><th>D.</th><th>Pr</th><th>VT</th><th>Temp.</th><th>Vo</th></tr> <tr> <td colspan="6">-----</td></tr> <tr> <td colspan="6">19.02.2003:</td></tr> <tr> <td>000091 14:39</td><td>4</td><td>11</td><td>(1001)</td><td>+19,9</td><td>997</td></tr> <tr> <td>000092 16:15</td><td>7</td><td>11</td><td>(1745)</td><td>+25,9</td><td>1729</td></tr> <tr> <td>000092 16.15</td><td>0</td><td>21</td><td>(1)</td><td>-</td><td>-</td></tr> <tr> <td colspan="6">20.02.2003:</td></tr> <tr> <td>000093 10.25</td><td>10</td><td>12</td><td>2525</td><td>+25,3</td><td>(2502)</td></tr> <tr> <td colspan="6">-----</td></tr> <tr> <td>Heating oil</td><td>11</td><td></td><td>2746</td><td></td><td>2726</td></tr> <tr> <td>Diesel</td><td>12</td><td></td><td>2525</td><td></td><td>2502</td></tr> <tr> <td>Additive (0.5L)</td><td>21</td><td></td><td>1</td><td></td><td>-</td></tr> <tr> <td colspan="6">-----</td></tr> <tr> <td>Total</td><td></td><td></td><td>Meter</td><td></td><td>Tour</td></tr> <tr> <td colspan="6">-----</td></tr> <tr> <td>Liquids</td><td>VT</td><td>L</td><td>6472</td><td></td><td>5270</td></tr> <tr> <td></td><td>Vo</td><td>L</td><td>6419</td><td></td><td>5227</td></tr> <tr> <td>Additive</td><td></td><td>L</td><td>0,00</td><td></td><td>0.00</td></tr> <tr> <td colspan="6">-----</td></tr> <tr> <td colspan="6">-End of List-</td></tr> </table>					Receipt Time	D.	Pr	VT	Temp.	Vo	-----						19.02.2003:						000091 14:39	4	11	(1001)	+19,9	997	000092 16:15	7	11	(1745)	+25,9	1729	000092 16.15	0	21	(1)	-	-	20.02.2003:						000093 10.25	10	12	2525	+25,3	(2502)	-----						Heating oil	11		2746		2726	Diesel	12		2525		2502	Additive (0.5L)	21		1		-	-----						Total			Meter		Tour	-----						Liquids	VT	L	6472		5270		Vo	L	6419		5227	Additive		L	0,00		0.00	-----						-End of List-						<p>The trip report shows three information blocks beneath the report heading:</p> <p> Block 1 shows details of each delivered product:</p> <ul style="list-style-type: none"> • Receipt Document number • Time Point of time when the delivery started • D. Duration of the delivery in minutes • Pr Product register • VT Uncompensated volume in liters • Temp. Average product temperature during delivery in °C • Vo Compensated volume in °C <p> The volume, which is relevant to the respective discharge (VT for temperature-uncompensated measurement of the delivered volume, V0 for compensated measurement), is shown in brackets. In the case of bulk goods the delivered quantity is displayed in column VT.</p> <p> Block 2 forms the cumulative block. Here the sums of all the products delivered in the time covered by the report are listed.</p> <p> Block 3 shows the cumulative statuses of the measuring system (daily and total sums).</p>
Receipt Time	D.	Pr	VT	Temp.	Vo																																																																																																																								

19.02.2003:																																																																																																																													
000091 14:39	4	11	(1001)	+19,9	997																																																																																																																								
000092 16:15	7	11	(1745)	+25,9	1729																																																																																																																								
000092 16.15	0	21	(1)	-	-																																																																																																																								
20.02.2003:																																																																																																																													
000093 10.25	10	12	2525	+25,3	(2502)																																																																																																																								

Heating oil	11		2746		2726																																																																																																																								
Diesel	12		2525		2502																																																																																																																								
Additive (0.5L)	21		1		-																																																																																																																								

Total			Meter		Tour																																																																																																																								

Liquids	VT	L	6472		5270																																																																																																																								
	Vo	L	6419		5227																																																																																																																								
Additive		L	0,00		0.00																																																																																																																								

-End of List-																																																																																																																													

11.3 Detailed Report

If more information is required, then a complete trip report can be printed out. Here, all the information is listed in detail. The detailed report is shown below as a comparison to the short report.

The trip report shows three information blocks beneath the report heading:

Trip Report

Report date

: 20.02.2005

10:30

Meter Name

: PI-ME 97

Personnel ID

: 4150 (C. Anyone)

Tour start

: 19.02.2005

14.39

Tour end

: 20.02.2005

10:25

No.

Time

Product Name

Unit

VT

Client Dura.

Code

Temp.

Unit

Vo

Gross

Rec.

Pay.

Dens.

Mass

Delivery Mode

Selected Hose

Flow rate

19.02.2003:

91

14:39

Heating Oil

L

1001

000000

4

11

+19,9

L

997+

-

0

0

845,00

kg

842

Delivery

Wet hose

4L/min

92

16:15

Heating Oil

L

1745

000000

7

11

+25,9

L

1729+

1515,47

£

1

2

845,00

kg

1461

PT

Wet hose

4L/min

92

16:15

Additive (0,5L)

pcs

1+

000000

0

21

-

pcs

-

23,45

£

1

2

kg

-

20.02.2003:

93

10:25

Diesel

L

2525+

000000

10

12

+25,7

L

2502

-

0

0

835,00

kg

2089

Total

Heating Oil

L

2746

11

11

L

2726

1515,47

£

845,00

kg

2303

Total

Diesel

L

2525

10

12

L

2502

0,00

£

835,00

kg

2089

Total

Additive (0,5L)

pcs

1

0

21

pcs

-

23,45

£

£

1338.10

(Net takings)

£

1538.92

(Gross takings)

Block 1

gives 3 lines of detailed information for each product delivered:

No.

Document number

Time

Point of time when the delivery started

Product Name

Name of delivered product in plain text

Unit

Unit of measurement for the following compensated volume

VT

Uncompensated volume in liters

Client

Client number. The client number query can be activated before starting discharge with parameter **3.1.4.5.3**.

Dura.

Duration of the delivery in minutes

Code

Product code (product register)

Temp.

Average product temperature in °C

Unit

Unit of measurement for the following uncompensated volume

V0

Compensated volume in liters

Gross

Sales price incl. VAT

Rec.

Type of document printed:

0

Delivery receipt

1

Invoice, gross (incl. VAT)

2

Invoice, net (excl. VAT)

3

Self-loading

(currently only for UK version)

4

Product transfer

(currently only for UK version)

Pay.

Payment upon invoice print-out

0

No payment

1

Cash

2

Cheque

3

Credit card

4

Debit procedure /

direct debit authorization

9

Undefined

Dens.

Reference density for calculation of temperature compensation

Mass

The weight of delivered product calculated from the volume and density

Discharge mode

- Discharge

- Product Transfer

- Self-Loading

Hose path

Block 1

gives 3 lines of detailed information for each product delivered:

- No. Document number
- Time Point of time when the delivery started
- Product Name Name of delivered product in plain text
- Unit Unit of measurement for the following compensated volume
- VT Uncompensated volume in liters
- Client Client number. The client number query can be activated before starting discharge with parameter **3.1.4.5.3**.
- Dura. Duration of the delivery in minutes
- Code Product code (product register)
- Temp. Average product temperature in °C
- Unit Unit of measurement for the following uncompensated volume
- V0 Compensated volume in liters
- Gross Sales price incl. VAT
- Rec. Type of document printed:
 - 0 Delivery receipt
 - 1 Invoice, gross (incl. VAT)
 - 2 Invoice, net (excl. VAT)
 - 3 Self-loading (currently only for UK version)
 - 4 Product transfer (currently only for UK version)
- Pay. Payment upon invoice print-out
 - 0 No payment
 - 1 Cash
 - 2 Cheque
 - 3 Credit card
 - 4 Debit procedure / direct debit authorization
 - 9 Undefined
- Dens. Reference density for calculation of temperature compensation
- Mass The weight of delivered product calculated from the volume and density
- Discharge mode
 - Discharge
 - Product Transfer
 - Self-Loading
- Hose path

Final total

Meter

Tour

Liquids

VT L

6472

5270

Vo L

6419

5227

Additives

L

0,00

0.00

-End of List-

- Unmetered (1/2)

- Wet hose (1/2)

- Dry hose (1/2)

- Dry hose G (S) (Gravity discharge)

- Dry hose P (Pumped)

- Bypass (1/2)

• Flow rate

Average flow rate during discharge

(L / min)

☺

The relevant volume for the respective discharge (VT for temperature-uncompensated measurement of the delivered volume, V0 for compensated measurement) is marked with a plus sign (+). In the case of bulk goods the delivered quantity is displayed in column VT.

Block 2

forms the cumulative block. Here the sums of all the products delivered in the time covered by the report are listed.

Block 3

shows the cumulative values of the measuring system (daily and total sums).

11.4 Copy Receipt

- If a receipt is lost or has become contaminated or illegible because the ink ribbon was worn out, you can repeat this printout at any time with the function Copy receipt.
- The addition "Copy" is printed on the receipt to differentiate from the original.

11.5 Zero Bill

- A blank receipt is printed out with the function Zero Bill.
- With this receipt you prove that the MultiFlow is in the standby mode and not in the discharge mode already.
- The receipt counter is not incremented.

Example of a Zero Bill:

ZERO BILL	
Meter ID . :	Z-4711
Receipt ID :	61
Deliv. Date :	27.05.2005
Deliv. Start :	14:47:35
Deliv. End :	14:37:36
Customer ID :	000000
Starting Account: 0 L	

Signature	
You've been served	
By:	Driver

11.6 Parameter List

11.6.1 Printout of Parameter List (example)

The function **parameter list** is subdivided into three points:

Menu <Print> Button

- With the function **W & M setting** only the parameters relevant to W & M regulations are printed. It is therefore possible to obtain a quick overview of the data of interest to the W & M inspector.
- The complete set of parameters is printed out with **All settings**. This also includes those parameters not relevant to W & M regulations.
- With the function **Driver list** the list of all defined drivers with name, personnel number and master code is printed.
- With the function **Print Form** all elements of the form, ID, XY, attributes, options and format for receipt and invoice, with their associated parameters, are printed. See chapter 10 "**Form Description**" / page 190.

Parameter List		
Selection: 5		
1	W&M Settings	
2	All Settings	
3	Driver List	
4	Print Form	
Up	Down	---
F1	F2	F3

Parameter List

(Sample printout!

For further information, please see the annex)

Serial Number : 16TK0001
00
Device Number : 18UB0001
Meter Name : Z-4711
Personnel ID : 000001

Version : 3.54[3.54]GE
ABCDEF00
Report date : 05.08.2011 11:50
Reference : *000017*

The seal is approved!

Grand totals

Uncompens. Volume 217169 L
Compensated Vol. 205973 L
Compens. Weight 32098 kg
Total Additives 0.00 L
Fail volume 0.00 L

Device Settings

311 + Device Number 18UB0001
312 + Meter Name Z-4711
313 + Seal Password #####

3141 Operating Mode Standard
3142 Save Display 15 min

31431 Valid Currency Currency A
31432 Exchange Rate 1,955830
31433 Position Symbol After
31434 Currency Symbol A £
31435 Currency Resol. A 2
31436 Currency Symbol B EUR
31437 Currency Resol. B 2

31451 Driver ID Query No
31452 Language Query No
31453 Customer ID Query No
31454 Cust Type Query Yes
31455 Add Products Query Yes

3148 Add Surcharge No
3149 Default Surcharge 31

- Page 1 -

MultiFlow: Z-4711 (16TK0001)
Setup Count: 000017
05.08.2011, 15:51

31401 Billing w. VAT

3151 + Volume Resolution 0
3152 + No. of Discharges 1
3153 + Minimum Preset 200 L
3154 + Minimum Form 2,3, (11:12),25
3155 + Price Correction Yes
3156 + Decimal Separator .
3157 + Show Additive No
3158 + Flushing Volume 0 L
3159 + Force deliv. stop 0 min

3161 Global Node No. 0
3162 CAN-Termination 1
3163 OBC Node 0

Remote Control

31641 Enable Control No
31642 Remote Ctrl Node 0

Level Probe

31651 Probe Timeout 18
31652 Level Probe Node 0

Deadman Switch

31661 Enable Switch No
31662 Probe Timeout 18
31663 Deadman Sw. Node 0

3171 Internal Node No. 0
3172 Display No. 1 1
3173 Display No. 2 0

Valve Control

3181 + Path Selection Basic Control
3182 Turn-on Delay 10 sec
3183 Turn-off Delay 10 sec

Flow Control

31841 High Flow Rate ON 5 L
31842 High Flow Rate OFF 20 L
31843 Wet Hose OFF 0,5 L
31844 Dry Hose (G) OFF 0,5 L
31845 Dry Hose (P) OFF 1,5 L

etc.

11.6.2 Printout “Driver list”



In the driver list shown below, under personnel ID number 7842 the driver “C. Anyone” is defined with the password “1”. No other drivers are defined. Furthermore, the personnel ID number 999999 is defined as master with the password 654321. This factory setting is intended for the MultiFlow installation and can be changed at any time.

Example of driver list:

```

Driver list

Report date       : 27.11.2011   12.23
Meter number      : PI-ME 97
-----
(36) Driver's name
-----
7842:              C. Anyone (    1)
   1:              Driver (    0)
   1:              Driver (    0)
   1:              Driver (    0)
999999:           Master (654321)

- End of List -

```

11.6.3 Printout „Receipt Title“

Example of a receipt title printout:

```

RECEIPT TITLE

      (COPY)
Meter ID       :#18#
Receipt ID     :#18#
Deliv. Date    :#18#
Deliv. Start   :#18#
Deliv. End     :#18#
Customer ID    :#18#

PRODUCT BLOCK 1

Total BLOCK 1

-----
      Signature

You've been served

```

```

By: #15#
405 (341) Spacing      : Characters
(342)  Columns Offset: 0
(343)  Lines Offset  : 0

(344) Form Description      Y   X Attr Opt
-----
Standard Receipt    ( 0)   0   0
RECEIPT TITLE      (20)   0   0 DW
(COPY)             (25)   2   8 B   K
Meter ID           :#18# ( 2)   3   0
Receipt ID         :#18# ( 3)   4   0
Deliv. Date        :#18# ( 8)   5   1
Deliv. Start       :#18# ( 9)   6   1
Deliv. End         :#18# (10)   7   1
Customer ID        :#18# ( 4)   8   1
PRODUCT BLOCK 1    (12)  10   0 D
TOTAL BLOCK 1      (14)  14   0 D   R
----- ( 1)  25   8
Signature          ( 1)  26  11
You've been served ( 1)  30   0
By: #15#           (18)  31   0

-End of List -

```



Compare also parameter **3.4.5** and chapter 10 "**Form Description**" / page 190.

11.7 Event report

- The event report prints in chronological sequence all the events recorded in the log book.
- For the printout you define a reporting period for which a log book printout is to be carried out. Mainly this printout is of interest to the service personnel, because alarms are listed here which indicate possible sources of error or faults.

Example of event report:

Event report

Report date : 27.05.2005 12.23
Version : 3.40[3.40]UK
MeterID : PI-ME 97

The seal is approved!


13.11.1997 14:32
Login 987122 (Anyone, Driver)
13.11.1997 14:45
Drop Heating oil 2015 L
13.11.1997 16:22
Drop Heating oil 4365 L

- End of List -

11.7.1 Log Book

In the log book all activities on the device (in particular discharges) are logged. From this log the trip reports are generated.

The log book (list of events) is designed as a ring buffer in which only a limited number of events can be retained (approx. 100 receipts).

 For data security the event data are protected with a checksum.

The following events are retained in the log book:

Event	Data	Meaning
SysInf	PowerUP Emergency receipt	<ul style="list-style-type: none"> Switching on the device Producing an emergency receipt
GPS	E.g.: C'5338.546360'N'953.363720'E '26.50'4'1.2	<ul style="list-style-type: none"> GPS coordinates Status: C: current coordinates, L: last valid coordinates, N: N/A Latitude Hemisphere latitude Longitude Hemisphere longitude Height Number of satellites Position error
	N	<ul style="list-style-type: none"> The system can supply GPS data, but no data is available at the moment.
Office		Information about office communication
Logon	000001 (Driver)	<ul style="list-style-type: none"> Logon: Switching on, initialization, driver registration. Driver log-in. If driver log-in is deactivated at the start up of MultiFlow (parameter 31451) then driver no. 1 is entered. 000001 Driver number (menu 36x1) Driver Driver name (menu 36x2) Driver Access level (driver or master)
Logoff	dto.	Powerdown
Error	No link to #2	<ul style="list-style-type: none"> Error: An error has occurred No link to #2 No link to the CAN bus member with the node number 2 can be established. Level Timeout Within the transmission interval for the radio delivery safety (parameter 31651) no signals have been received. Might be caused by radio interference etc. Deadman Timeout Within the transmission interval for the dead man switch (parameter 31662) no signals have been received. Might be caused by radio interference etc.
Information about external IO module		
EIOInf	Online	External IO module connected and ready for operation.

Event	Data	Meaning
	Connect lost	Interrupted CAN communication.
	Onl.Reset	Reset detected in online mode.
	ReConfig detect	Change to configuration detected.
	Stopped	Communication with module cancelled.
	Error solved	Error status automatically rectified.
External IO module events.		
EIO	INx change:y	Status at input x of the IO module changed to status y.
Information about external sensor module.		
SIInfo	Online	External sensor module connected and ready for operation.
	Connect lost	Interrupted CAN communication.
	Onl.Reset	Reset detected in online mode.
	Unconf. change	Change to non-configured sensor detected.
	ReConfig detect	Change to configuration detected.
	Stopped	Communication with module cancelled.
	Disabled	Sensor module operation cancelled.
	Unkn.Sensor x	Sensor event detected for unknown sensor x.
	No conf.Change	Short-term sensor change not confirmed.
	Unkn.Sensor x	Change to unused sensor x.
	Error solved	Error status automatically rectified.
	NamurReset NAK	SI Namur status cannot be reset.
	SetDate NAK	Date/time cannot be updated.
	ScanInterv.NAK	Scan interval configuration failed.
	Type set repeat	Transfer of sensor types failed.
	Monitor enabled	Sensor monitor enabled.
	Monitor dis/man	Sensor monitor manually disabled.
	Monitor dis/sen	Sensor monitor disabled by sensor.
Sensor module status information		
SIStat	01-----12---0----0	Statuses of activated sensors (1 .. 20), "-" -> not used
SIIndx	11-----22---5----7	Sensor type as stated in 3.1.6.9.7. 1 = Dome cover, 7 = Handbrake.

Event	Data	Meaning
Sensor events		
SI	121208-130622 M:ON I: 1(1-2) S:1(akt)	Online event. Date(DDMMYY)-time(HHMMSS), I: Sensor index input (sensor group - sensor group index) In this example: SI input 1 (DOM lid cover sensor no. 2) S: Status (0/1) + interpretation whether acting as closed or open (active/passive). Also 2 (interruption) and 3 (short circuit) for Namur sensors. In this example: ACTIVE
	121208-090536 M:OFF I:19(2-1) S:1(akt)	Offline event read from sensor module logbook. Date(DDMMYY)-time(HHMMSS), I: Sensor index input (sensor group - sensor group index) In this example: SI input 19 (API coupling no. 1) S: Status (0/1) + interpretation whether acting as closed or open (active/passive). Also 2 (interruption) and 3 (short circuit) for Namur sensors. In this example: ACTIVE
Sensor module alarms:		
Error	SI no Resp. SI Intf.NoRsp SI NamurNoRsp SI NamResNoRsp SI SetDatNoRsp SI ScanIvNoRsp SI FIFO NoRsp SI SenTypNoRsp SI SensorNORsp	Sensor module does not answer. Message informs about the internal status of the MFSI control.
	SI Interf.: x SI Onl.Err: x	Module error detected. 01: CAN error 02: SW Watchdog 04: HW Watchdog 08: RAM error 10: ROM error 20: Reset State
	SI Namur: x	Defective SI Namur Status. 01: Low Battery 02: Logbook erased 04: Automatic wakeup disabled 08: Power-off
	SI FIFO:x	Defective FIFO status. 01: Buffer overrun 02: FIFO recovered due to problem 04: FIFO cleared due to problem
	SI type set	Sensor type could not be set.
System Alarms:		
ALARM	Log corrupt	The logbook contains one or more invalid entries.
	Log cleaned	The logbook entries have been completely deleted.
	Password failed	An incorrect password has been entered.
	SoftSeal failed	The seal has been broken because of an internal error.

Event	Data	Meaning
	Low memory	Insufficient working memory is available to the system.
	EEPROM failed	An error has occurred in the EEPROM memory.
	CAN-Telegram	An unrecognized CAN telegram has been received.
Master Alarms:		
ALARM	RAM Read/Write Test	Self test: RAM defective.
	EPROM Checksum	Self test: EEPROM checksum defective.
	Appl. Memory Test	Self test: Working memory defective.
	Class1 Memory Test	Self test: Working memory defective.
	Class2 Memory Test	Self test: Working memory defective.
	Class3 Memory Test	Self test: Working memory defective.
	Display Com.	Communication error with the display.
	W&M Printer	Communication error with the FDW printer.
	Parameter Error	Setup defective.
	CAN-Bus Error	Communication error on the CAN bus.
	Master ?????	Unknown master error.
Parameter Alarms:		
ALARM	Product Setup	The setup is defective in the area of the products (35xx).
	Meter Setup	The setup is defective in the area of the equipment settings.
	Printer Setup	The setup is defective in the area of the printer settings.
	Sensor Setup	The setup is defective in the area of the sensors.
	Form Setup	The setup is defective in the area of the form layout.
Meter Alarms:		
ALARM	Temperature	A product temperature lies outside the permitted range or an impermissible jump in temperature.
	Temp-Limit	
	Pulse Error	A pulse error has been registered. (A and B pulses differ)
	Neg. Volume	An impermissible reverse flow has been registered.
	Pulse-Sensor	A functional error in the pulse sensor has been registered.
	Power Fail	The supply voltage monitor has detected an unexpected failure of power.
	Additive Cycle	The additive pump was unable to carry out a complete pump cycle within the prescribed time period.
	Additive Speed exceeded	For the current product flow an additive pump rate has been determined that the pump cannot fulfill.

Event	Data	Meaning
	Additive Empty	The internal level sensor of the additive pump has signaled "empty".
	Ext. Additive Empty	The external level sensor of the additive pump has signaled "empty".
	Additive: Start Position	The monitoring of the pump piston has not detected the start position.
	Additive: Piston Position	The monitoring of the pump piston has not detected the start position.
	Hose: Illegal Selection	The operator has made an impermissible hose selection (only in the case of fully electronic selection).
	No Flow Error	No flow has been measured for an extended period of time.
	Parameter Error	A parameter lies outside the range of values valid for the parameter (parameter conflict).
	Interlock Error	The seal has been broken.
	Remote-IO Sensor Error	An error in the Multi-IO sensor has been detected.
	Meter ?????	Unknown meter error.
Discharge Alarms:		
Setup	3161 Global node no.:1	Setup: A parameter was changed 3161: The changed parameter Global node no.: Parameter name 1: The new parameter value
Drop	(??) Heating oil EL 1250 L	Drop: A delivery was performed (??) The device was not sealed Heating Oil EL: Product code 1250 L Discharged quantity
	(OK) Heating oil EL 1250 L	Drop: A delivery was performed (OK) The device was sealed Heating Oil EL: Product code 1250 L Discharged quantity
PT	(??) Heating oil EL 1250 L	PT: A product transfer was performed (??) The device was not sealed Heating Oil EL: Product code 1250 L Transferred quantity
	(OK) Heating oil EL 1250 L	PT: A product transfer was performed (OK) The device was sealed Heating Oil EL: Product code 1250 L Transferred quantity
SL	(??) Heating oil EL 1250 L	SL: A self-loading was performed (??) The device was not sealed Heating Oil EL: Product code 1250 L Loaded quantity
	(OK) Heating oil EL 1250 L	SL: A self-loading was performed (OK) The device was sealed Heating Oil EL: Product code 1250 L Loaded quantity
Report Alarms:		
Corrupt!		The logbook contains one or more invalid entries.
Short Report		A short report has been printed.

Event	Data	Meaning
Detail Report		A detailed report has been printed.
Chip Report		A report chip has been generated.
Seal Alarms:		
Seal Failure	HW Seal broken	The hardware seal has been broken.
	Program BCC	Seal break on account of a defective checksum.
	Setup Count	Seal break on account of a defective setup of meter.
	Memory Class 1	Seal break on account of a defective memory.
	Memory Class 2	Seal break on account of a defective memory.
	Memory Class 3	Seal break on account of a defective memory.
Drain Alarms:		
Drain Meter	Activated	Connection MultiFlow <-> EPE2 connected
	Deactivated	Residue removal monitoring via EPE2 deactivated
	Link establ.	Connection MultiFlow <-> EPE2 re-connected
	Link lost	Connection MultiFlow <-> EPE2 interrupted
	PreCycle done	Residue removal monitoring via EPE2 activated and complete residue removal cycle detected.
	Finish->go on	Residue removal procedure completed before a discharge
	Drain started	Residue removal started
	Drain complete	Residue removal ended
	Auto-Started	Start of autom. residue removal via menu point 8
	Auto-NoLink	Connection broken during autom. residue removal
	Auto-ErrorStop	End of autom. residue removal because of a problem
	Auto-TimeStop	End of autom. residue removal because the maximum period for residue removal has been reached
	Auto-UserStop	Autom. residue removal ended by the user
	11->12 YES	Product changeover from 11 to 12, required residue removal has been carried out.
	11->12 NO	Product changeover from 11 to 12, required residue removal suppressed by user input.
	13->11 OK	Product changeover from 13 to 11, information regarding prohibited residue removal has been acknowledged by operator with OK.
IO module alarms:		
Error	EIO NoRsp	IO module does not answer.
	EIO Intf.NoRsp EIO IO NORsp	Message informs about the internal status of the MFSI control.

Event	Data	Meaning
Error	EIO Interf: x EIO Onl.Err: x	Module error detected. 01: CAN error 02: SW Watchdog 04: HW Watchdog 08: RAM error 10: ROM error 20: Reset State

11.8 Office transfer

It is possible to send delivery and event reports to the office interface (e.g. FTP server) in combination with an EMIS connected to the external CAN bus. This function is available only in connection with an EMIS!



Press the <Print> key to activate the reports menu.

Reports menu



The reports menu appears on the display.



Select item 7 "Office connection".

Reports	
Selection:	
1	Short report
2	Detailed report
3	Copy receipt
4	Zero receipt
5	Parameter list
6	Event report
7	Office connection
8	(---)
9	(---)
0	Other
Forward	Back ---
F1	F2 F3

Office connection menu

Select item 2 "Office transfer".

Office connection		
Selection: 7		
1	Chip-Card	
2	Office transfer	
Up	Down	---
F1	F2	F3

Office transfer menu

The choice is between delivery and event data.



Depending on the selection the operator can limit the scope of the report by specifying the range of receipt numbers (delivery data only) or by limiting the period of time.



If data is available in the specified receipt/time frame, the transfer begins. The data is initially transferred to the EMIS.

Once this transfer is complete, the data is sent from the EMIS via GSM/GPRS to the office interface.



The MultiFlow displays different status screens depending on the transfer phase via which the operator is informed about the current transfer status.

Office transfer		
Selection: 72		
1	Delivery data	
2	Event data	
3	Sensorüberwachung	
Forward	Back	---
F1	F2	F3

Delivery data / MultiFlow -> EMIS

In the case of a local data transfer from the MultiFlow to the EMIS the current transfer progress is displayed in percent.



The transfer to the EMIS can be interrupted by pressing the **<STOP>** key.



Once all data has been transferred to the EMIS the following status screen is displayed for the external data transfer.

Delivery data		
Data transmission		
MultiFlow -> EMIS		
Please wait		
50 %		
---	---	---
F1	F2	F3

Delivery data / EMIS -> Office



Once the local data transfer from the MultiFlow to the EMIS is complete the EMIS starts to transfer the data to the office interface (e.g. FTP server). The EMIS requires some time for the transfer because a GSM/GPRS connection is created for this purpose. The MultiFlow receives feedback from the EMIS about any connection problems and/or is notified of the end of the transfer.

Delivery data		
Data transmission		
EMIS -> Office		
Please wait		
...		
---	---	---
F1	F2	F3



The following message appears after the data transfer is complete:

"Successful data transmission!"

11.9 Update report (example)



The following description is relevant only for program versions 5.00 and higher (approval according to MID).



A printout of the current update report can be obtained via the "Update report" menu item (**menu 4.6.3**).

This report contains general information and also the number of remaining available downloads attempts. The "*Update progress*" section contains a list of all software downloads started or executed so far along with date, time, status ('-' = incomplete download, '+' = complete download), checksum and user ID.

Sample printout of an update report:

```

Update report

Serial number   : 00600004
Device number   : - ? -
Meter des.      : - ? -
Personnel no.   : 000001

Report date     : 06.12.2006 13:45
Version         : 5.00[5.00]DE
Seal number     : 005591
-----
Remain. attempts : 25
-----

Update progress :

06.12.06/12:54 - 00000000 TEST1
06.12.06/12:56 + EC2F31E2 FAS-SENING
06.12.06/13:08 + EC2F31E2 ABCDEFGHIJ
06.12.06/13:30 - 00000000 ZYXWVUTSRQ
06.12.06/13:36 + EC2F31E2 TEST2
-----

```

11.10 Sensor monitor status report



The sensor monitor status report can be selected only if the sensor module support is active.

A printout of the actual status report for the sensor monitor can be obtained via the "Sensor monitor" menu item (**menu 0.1**) in the print menu and/or via "Print" in the "Sensor monitor" menu item (**menu 4.8.3**).

Monitor status report	
Serial Number	: 600004
Device Number	: - GNr -
Meter Name	: - ? -
Personal ID	: 999999
Report Date	: 12.12.2011 10:41
Version	: 3.54[3.54]GB
	BA7BFA2A
Setup Count	: *000981*




Status	
	ACTIVE
	- Sensor -
	SI Connected

Date	: 12.12.2011 10:36
ID	: 000001
GPS -C-	: N 05338.54642
	E 00953.37156

Monitor status report	
Serial Number	: 600004
Device Number	: - GNr -
Meter Name	: - ? -
Personal ID	: 999999
Report Date	: 12.12.2011 11:10
Version	: 3.54[3.54]GB
	BA7BFA2A
Setup Count	: *000981*

Status	
	INACTIVE
	- Sensor -
	SI Connected

Date	: 12.12.2011 11:03
ID	: 000001
GPS -C-	: N 05338.54642
	E 00953.37156

-  The status report is divided into different sections. The upper section contains the specific device data for the MultiFlow and the time the report was created.
-  The central section gives clear information about the current monitor status and the status of the connection to the external sensor interface (SI). If the monitor has been deactivated (status "INACTIVE") additional information is given as to how the deactivation was triggered. This can be caused by the change in status of a sensor with activated alarm message ("-Sensor-") or manually by the user ("-Manual-", **menu 4.8.1**).
-  The bottom section of the status report contains additional information about the sensor monitor. Along with the time and the unique monitoring ID, the GPS position at the time the sensor monitor was activated is also given. A "-C-" indicates that GPS data was available at the time of the activation, while an "-L-" indicates that no GPS data was received at the time and this is the most recent valid GPS position.



Example of a conversion of the coordinates into a format supported by Google Maps:

N.5338.54642 , E.953.37069 -> +53°38.54642, +09°53.37069



The GPS position can only be given if the MultiFlow is operating with a GPS-compatible EMIS.

11.11 Event report, sensor monitor

- The event report prints out all sensor events entered in the logbook in chronological order with a number (xxxx).
- Enter a reporting period for which you require a logbook printout.

Sample printout of an event report:

Event report

```
Report date   : 05.03.2009 09:37
Version      : 3.54[3.54]DE
Meter des.   : - ? -
-----
The seal is OK!
-----
04.03.2009 13:28 ( 189) SysInf: PowerUp
04.03.2009 13:29 ( 191) GPS: C'5338.550700'N'953.366200'E''
04.03.2009 13:29 (   2) SIStat: 0000-----2232-----0
04.03.2009 13:29 (   2) SIIndx: 1111-----2222-----7
04.03.2009 13:29 (   3) SIInfo: Online
04.03.2009 13:29 (   4) GPS: C'5338.549600'N'953.367300'E''
04.03.2009 13:29 (   4) SI:040309-132915 M:ON I:12 S:2
04.03.2009 13:30 (   5) GPS: C'5338.554600'N'953.364200'E''
04.03.2009 13:30 (   5) SI:040309-133011 M:ON I:20 (7-1) S:1 (akt)
04.03.2009 13:30 (   6) GPS: C'5338.554600'N'953.364200'E''
04.03.2009 13:30 (   6) SI:040309-133015 M:ON I:20 (7-1) S:0 (pas)
04.03.2009 13:30 (   7) GPS: C'5338.554600'N'953.364200'E''
04.03.2009 13:30 (   7) SI:040309-133019 M:ON I:20 (7-1) S:1 (akt)

- End of printout -
```

Parameter	Description	Valid values
SI:	Detection of a sensor interface event	- - -
ddmmyy-hhmmss	Time and date stamp	- - -
M	Mode of sensor interface	ON - Online event OFF- Offline event
I:n(x-y)	Sensor information n: SI input x: sensor group y: index within sensor group	n: 1 .. 20 x: 1 .. 7 (see parameter 3.1.6.9.7) y: 1 .. chamber number

Parameter	Description	Valid values
S: v(w)	Condition description v: logic condition w: interpretation of condition dependent on sensor	v: 0: logic unit 0 1: logic unit 1 2: interruption 3: short-circuit w: akt (active) pas (passive) ubr (interruption) krz (short-circuit)

Example:

SI:040309-133011 M:ON I:20(7-1) S:1(akt)

Date: 04.03.2009, 13:30:11

Online event

MFSI input 20, sensor: hand-brake, index:1

At the input there is a logic unit 1. One closing device was used which is now ACTIVE.

SI:040309-141532 M:OFF I:16(1-3) S:0(pas)

Date: 04.03.2009, 14:15:32

Offline event

MFSI input 16, sensor: dome top, index: 3

At the input there is a logic unit 0. One closing device was used which is now PASSIVE.

12 Error messages and status information

☐ The MultiFlow error messages are subdivided into several categories. The errors with the lowest priority normally arise due to erroneous input by the operator. After acknowledgement of the error message (normally with <F1>), these are immediately rectified by correct input.

Other errors which indicate a severe malfunction in the program execution are listed below (in alphabetical order):

Message		Meaning
Additive Max. cycle time exceeded !	1	The additive pump (also called "dosage pump") was not able to execute a complete pump cycle within the specified time period. The delivery is interrupted and a receipt must be printed.
Additive Max. pump rate exceeded !	2	The MultiFlow has determined an additive pump rate for the current product flow which the pump cannot deliver. The delivery is interrupted and a receipt must be printed.
Additive Product filling level undercut !	3	The internal filling level sensor on the additive pump signals "empty". The delivery is interrupted and a receipt must be printed.
Additive Ext. filling level undercut !	4	The external filling level sensor on the additive pump signals "empty". IMPORTANT: This information is not currently processed!
Additive Start position not detected !	5	The MultiFlow has not detected the initial position on monitoring the pump piston. The delivery is interrupted and a receipt must be printed.
Additive Motion error ! Position unknown!	6	The MultiFlow has received impermissible information on monitoring the piston position (both positions detected simultaneously). The delivery is interrupted and a receipt must be printed.
ATTENTION SoftSeal is broken Discharge forbidden	7	Message before preset input.
Break the SoftSeal before entering this Parameter !	8	Device is sealed (electronic seal set) and an attempt has been made to alter a parameter in the region subject to calibration.
Chip Card Data Transfer OK!	9	Appears after successful transfer of the parameters to the chip card. Confirmation of the transfer generates a display that the transfer is complete and that the chip card can be taken out. (menu 451, 452)
Chip Card Data Transfer failed !	10	Appears during loading of parameters from the memory card, if the instruction "Break the SoftSeal before entering this parameter!" has been confirmed with <F1> for "OK". (menu 451, 452) ATTENTION: The error message applies only for the transfer of the parameters subject to calibration. All others have already been transferred.
Chipcard Failed ! Card not released Continue ?	11	The report chip is to be overwritten, the chip card however still contains report data that will not be processed by the target computer (office)!
Chipcard Failed ! Wrong format Continue ?	12	Safety query: The format of the chip card does not correspond to the format selected (e.g. card empty, tour data instead of setup) If "yes" is selected the transfer is carried out; any data present on the chip card is lost.


Message		Meaning
Chipcard Full ! Please insert next Chipcard	13	If the cumulative report data exceed the capacity of one chip card, the remaining data can be transferred to a second card, etc. In this event the following message appears after the data transfer. ATTENTION: To avoid loss of data it is essential that the chip card is changed before confirmation of the message.
Customer ID illegal !	14	Display appears if parameter 31453 (customer no. query) is set and no customer number has been entered.
Data Copied!	15	With selection via the product menu 35xx759 : Copy of all meter factors from another product register. Message appears after the copying has been completed.
Delivery Interrupt by Level Sensor !	16	The discharge has been interrupted by the level sensor. After confirmation of this message the discharge can be continued.
Do you want to enter Master access level?	17	An action has been selected for which Master access rights are required (e.g. modify parameters).
Do you want to save changes ?	18	Message appears when the form editor is exited.
ERROR Flow rate below Minimum !	20	During the discharge the flow rate dropped below the min. flow rate for more than 30 seconds. The discharge is interrupted and can be resumed by pressing "START" or terminated with the "STOP" key.
ERROR Hose selection not permissible!	21	The operator has made an impermissible choice of hose (only occurs with fully electronic selection).
ERROR No flow !	22	The MultiFlow has measured no flow over a lengthy time period. This message is triggered after the maximum waiting period has been exceeded. The discharge must be terminated (cf. parameter 3.1.5.1.9)
ERROR Dead Man Switch Time expired !	23	Within the interval set no signals have been received from the dead man switch. CAUSE: The device is perhaps switched off or radio interference is present. ATTENTION: Discharge interruption for safety reasons.
ERROR Malfunction at the Global CAN-Bus!	24	There is a malfunction on the CAN bus.
ERROR No access to remote control !	25	With remote control activated no link to the Multi-Control can be established. CAUSE: Remote control is probably switched OFF.
ERROR Radio Level Probe Time expired !	26	Only if radio-operated overfill prevention (AS) is activated: Within the time set (parameter 31651) no signals have been received from the radio-overfill prevention. CAUSE: The device is perhaps switched off or radio interference is present. ATTENTION: Discharge interruption for safety reasons!
ERROR Reset seal switch first !	27	An attempt has been made to set the seal although the seal switch is still in the "broken" position.
ERROR! SoftSeal failed check!	28	This message appears when the inspection of the soft seal has failed (Checksum mismatch!). IMPORTANT: A severe fault has occurred! Service personnel must be consulted.
ERROR! Delivery interrupted Printing receipt ...	29	This message appears after switch-on when the device has been switched off without terminating a running delivery with a receipt. A delivery note for the open positions is automatically printed.
Factory Reset Done!	30	If position 4 "Initialization" has been selected in the service menu (reset of device parameters (reproduction of factory settings)), this display appears in order to bring attention to the fact that all parameters have been set to factory settings. Therefore this step requires a special confirmation.
Form incomplete !	31	The form entered is not in agreement with parameter 3154 (minimum layout).

Message		Meaning
Insert Paper ...	32	Printing is initiated in long distance transfer mode, but there is no paper in the printer. Note: When this error has been rectified, the printer continues to print automatically!
Interruption by Product Transfer or Self Loading Sensor	33	Cause 1: During product transfer or self-loading the signal input has been deactivated (i.e. switch to normal discharge) Cause 2: During a normal discharge the signal input for product transfer / self-loading was activated. The delivery is interrupted and a receipt must be printed.
Is printer prepared ?	34	Appears in the display if the long distance transfer protocol (parameter 3161) is switched off and should be printed. Answer <F1> for "Yes" and printing takes place. Answer <F2> for "No" and the message appears: "Please cancel". Cause: The printer status cannot be determined by the software!
Log Book corrupted !	35	At least one record in the log book is corrupt, i.e. the checksum is not correct. Where possible, attempts are made to rectify the error automatically. However, in any case some information is lost!
Master Error !	36	General error message
MEMORY CHECK FAILED Check of all parameters needed!	37	After powering up the MultiFlow runs a self test; if an error occurs in the memory during this process, this display appears.
MEMORY CHECK FAILED! Restoring factory settings...	38	An error has occurred on monitoring the various memory sectors. The factory settings are automatically restored. IMPORTANT: All parameters are reset in this procedure. Further operation without consulting service personnel and without recalibration is not permissible!
Memory Too Low!	39	The system does not have enough memory. This is unlikely to occur during normal operation. IMPORTANT: A grave error has occurred! The device must be switched off and on again immediately!
More Products ?	40	The discharge of the current product is complete. After pressing <F1> for "Yes" the selection of product code and price is then possible. With the function key <F2> "No" input is concluded. This message can be switched off with parameter 31455. The number of metered discharges is recorded in parameter 3152.
No Printer configured!	43	Print function has been selected, but no printer is configured. (parameter 321 = "no printer")
Parameter Alarm	45	Appears upon conflict between parameters. Printing of a parameter report is offered (see chapter 11.6 "Parameter List" / page 219).
Parameter Error! Print Report ?	46	After powering up the MultiFlow runs a self test; if an error occurs in the parameter range during this process, this display appears. With pressing <F1> for "Yes", there is a printout of all errors established, such as range errors, incompatible combinations.
Parameter invalid !	47	A parameter lies outside the range of values valid for the parameter. Display during self test (power up and running).
Parameter out of range !	48	The value entered lies outside the range of values valid for the parameter. Display during editing.
Password Penalty! No Access! Try again later...	49	The operator has made an error in entering a password. NOTE: Re-entry is possible, but each repeated erroneous entry triggers increasing time delays.
Please Wait ! Printer in use by another unit.	50	This message can only occur when the printer is operated in a double metering system or with EMIS (printer sharing). NOTE: See chapter 9.3.1.7.1.1 "Dual Measuring System" / page 139.

Message		Meaning
Please drain the Meter !	51	If residual discharge has not been carried out the driver must press the <F2> key. A corresponding entry is then made in the logbook and this message is displayed: The MultiFlow remains in this operating state until it is switched off, i.e. it will not react to key entries (e.g. <START>, <STOP> etc.) (only if parameter 31851 is activated). NOTE: Restart the MultiFlow by switching it OFF and then ON again.
Price preset illegal !	52	The price entered lies outside the range allowed. (0...999999)
Print Receipt ?	53	After a successful discharge an invoice selection can be printed out with <F1> or a delivery note selection with <F2>. Depending on the setting of parameter 3.1.4.0.1 the invoice setting can be suppressed. In this case a delivery note is printed without query.
Print Invoice or Delivery Note ?	54	At the end of the discharge a receipt can be printed in the form of an invoice or a delivery note. A selection can be made between the printout of an invoice (<F1>) or a delivery note (<F2>). Depending on the setting of parameter 3.1.4.0.1 the invoice setting can be suppressed. In this case a delivery note is printed without query (see chapter 6.6 " Printing Delivery Notes and Invoices " / page 79).
Printer error! Incorrect response to FDW protocol	55	The printout of information relevant to W & M regulations on the receipts occurs in the FDW mode which ensures correct output. The error message indicates an error in the printer control. If the problem persists after repeated attempts, the receipt data must be copied manually from the display. IMPORTANT: Service personnel must be consulted immediately.
Printer does not respond!	56	Message appears if the long distance transfer protocol (parameter 3161) is switched off and should be printed. Cause: The printer status cannot be determined by the software! Printer probably switched off.
Product changed ! Was the Meter drained ?	57	When using the "device for emptying and refilling the measuring system" according to authorization 5.162 / 01.01, the operator is asked during a product change whether the necessary emptying / refilling has been carried out (only if parameter 31851 is activated). NOTE: See chapter 6 " Discharge " / page 69
Product changed! Drain the Meter?	58	The metering system residual discharge message can be switched on and off with parameter 31851 .
Product Selection illegal !	59	Message appears if, after a discharge, further products should be delivered, but the maximum number of metered liquid products (parameter 3152) has already been reached!
Pulse Error !	60	The maximum permissible number of disturbance/error pulses has been reached. The delivery is interrupted and a receipt must be printed (parameter 3313).
Pulse sensor defective !	61	The MultiFlow has detected a functional fault on the pulse transmitter. The delivery is interrupted and a receipt must be printed.
Remote-Mode! Manual Operation not allowed!	62	Mode of operation is set to remote operation. (parameter 3141) NOTE: Reset only possible via IMC or EMIS.
Resume Delivery ?	63	During the discharge the pre-selected quantity entered has been reached and the discharge stopped. If the discharge should be continued (press <F1> for "YES") the additional quantity to be delivered must then be entered. Should the discharge not be continued, press <F2> for "NO".
Resume with START Break with STOP Addition. Preset F1	64	A discharge that is underway has been interrupted and the pre-selected quantity entered has not yet been reached. With <Stop> the process can be interrupted, or with <F1> an additional quantity can be delivered.

Message		Meaning
Resume with START or Break with STOP !	65	After a discharge the pre-selected quantity entered has been reached and the MultiFlow therefore interrupts the discharge automatically. This message is displayed.
Return-flow error !	66	During delivery: the return flow volume has exceeded max. permissible value (parameter 3312). The delivery is interrupted and a receipt must be printed.
Selection Invalid	67	Message appears during the printing or storage of tour data. The selected range, selection via receipt number or time, is invalid (e.g. end time before start time).
Status Information Invalid !	68	The MultiFlow has been switched off during the discharge! After it has been switched on again a self test is performed, as a result of which inconsistent data is determined.
System contains gasoline product! No draining!	69	This metering system residue removal message can be switched on and off with parameter 31851 .
Temperature error !	70	The MultiFlow has registered either a product temperature outside of the permissible range or an impermissible change in temperature. In both cases the delivery is interrupted and a receipt must be printed.
The Seal has been opened!	71	Message after breaking the seal.
The Seal has been set!	72	Message after setting the seal.
This selection is not supported yet!	73	A blocked or de-activated menu item was selected (e.g. 3144).
This identification is unknown !	74	During registration as driver or master an unrecognized ID has been entered.
Transfer all data from Chipcard to MultiFlow?	75	Safety query during selection of menu 451: With <F1> for "Yes" -> start transfer; setup in MultiFlow is overwritten with the data from the chip card!! With <F2> for "No" -> abort process.
Transfer all data from MultiFlow to Chipcard	76	Safety query during selection of menu 452: With <F1> for "Yes" -> start transfer; data on the chip card is overwritten! With <F2> for "No" -> abort process.
Transfer in progress... Please wait !	77	During the transfer between chip card and MultiFlow, which lasts approx. 90 seconds, this information appears.
Unknown CAN-Telegram received !	78	An unknown telegram is received at the external (global) CAN Bus. This may be caused by a temporary disturbance. NOTE: Service personnel must be consulted if this alarm continues to appear.
Volume preset illegal !	80	During input of the minimum pre-selection value in the menu for calibration restrictions the minimum pre-selection value (parameter 3153) has not been met, or the maximum value has been exceeded.
WARNING Access only under W&M supervision!	81	Message appears before reset of all parameters to factory settings.
WARNING Additive load is nearly exhausted !	82	The additive quantity (storage) has exceeded the set minimum value (see menu 6).
WARNING Do you want to erase all data ?	83	Safety query during selection and menu 453 (formatting the chip).
WARNING Sealed Area !	84	A parameter that is subject to calibration protection has been selected for processing. NOTE: Data relevant to calibration is to be modified!
WARNING You are about to break the SoftSeal!	85	Information before the breaking of the seal.

Message		Meaning
Data transfer EMIS -> Office No feedback!	86	The data transfer from the EMIS to the office interface was aborted if the user did not wait for the EMIS confirmation.
Data transfer EMIS -> Office not supported!	87	The data transfer to the office interface is not supported by the connected EMIS.
Data transfer failed!	88	Problem arising during the data transfer.
Printer not ready!	89	The communication with the printer has been interrupted.
FDW protocol not supported by the printer!	90	The FDW protocol is active and the selected printer does not support FDW.
Printing...	91	A printout has been started and the output is proceeding without problem.
FAULT Electronic W&M seal has been infringed!	92	Self-test in progress produces a broken seal (seal switch).
Defective print process!	93	Print communication problems arising during the printing process.
Counterpart not ready!	94	EMIS is not ready to receive data.
OBC data transfer failed!	95	The external data transfer from the EMIS to the office interface has failed.
OBC connection not active!	96	Connection to the OBC could not be established.
Product change ! Carry out flushing?	97	The flushing monitor is active and a product change has been detected. The measuring chamber can be flushed.
Invalid order for delivery quantities! Entries ignored!	98	The delivery quantities of the scale prices of a product are not in ascending order.
Reference meter defective!	99	A defective reference meter has been detected.
Sensor interface DOME cover 1 active	100	Sensor module alarm message. Output for the respective sensor is displayed as soon as a change to a sensor status is detected. NOTE: Alarm messages must be acknowledged for each sensor group.
Sensor interface Dome cover 1 passive	101	Sensor module alarm message. Output for the respective sensor is displayed as soon as a change to a sensor status is detected. NOTE: Alarm messages must be acknowledged for each sensor group.
Temperature below minimum threshold	102	The product temperature has fallen below the minimum delivery threshold during the delivery.

 All error messages are recorded in the logbook and can be accessed through a printout (event report). See chapter 11.7 "**Event report**" / page 222).

13 Technical Data

13.1 MultiFlow

Power supply	15-30V/1.5 A max., (optionally max. 2.2 A for AI)
Pulse input channel	2-channel input, type settable via SW 1. 12V 2-channel pulse transmitter (pnp output) 2. 12V 2-channel pulse transmitter (npn output) 3. 2-wire current output for THS pulse transmitter
Pulse frequency	max. 10 kHz
Outputs	7 outputs for driving solenoid valves 12V/500mA per output Outputs protected against short circuit and overload
Inputs	EEx ib IIB 4 intrinsically safe inputs for switching contacts
Temperature input	Pt100 according to IEC751
Measurement range	-60 to 110 °C
Measurement error (-25 °C to 70 °C)	+/- 0.2 °C
Async. communication	1 Type of communication selectable via software switch 1. EIA232 2. RS232 3. RS422/RS485 Transmission rate 2400 to 19200 baud
Network communication (bus)	CANbus 100 kHz Termination resistors switchable via software
Intrinsically safe power supply	2 intrinsically safe outputs EEx ib IIB
Internal communication	Intrinsically safe CANbus EEx ib IIB
Operating temperature	-20 to 50 °C
Housing	IP65, die-cast aluminium
Ambient conditions	The following guidelines are fulfilled: OIML R 117 A.4.4 (IEC68-2-6) Sinusoidal vibrations OIML R 117 A.4.3 (IEC 68-2-30) Damp heat OIML R117 A.4.1 (IEC68-2-2) and A.4.2 (IEC68-2-1) Dry hot and cold temperatures
Interference immunity	The following guidelines are fulfilled: Conformance to OIML R 117 DIN EN 50 081-1 Interference emissions in living areas DIN EN 50 082-2 Interference immunity in industrial areas DIN 57 879-3 Radio frequency suppression on vehicles DIN 40839-1 EMC in road vehicles, conducted interference DIN 40839-3 EMC in road vehicles, induced interference DIN V ENV 50140 Interference immunity to electromagnetic fields

Functional safety	The following guidelines are fulfilled: DIN 26053 Trusted measurement procedure for tank vehicles for the delivery of fuel oil EL, diesel fuel and biodiesel to the end-consumer
-------------------	---

13.2 MultiFlow Control Device

Supply	24V nominal voltage (operating range from 15...30V) under 30 Watt, from built-in battery of corresponding vehicle, protected against overvoltage (>50V)
Data circuit	In intrinsically safe level of protection: II 2 G EEx d [ib] IIB T4 with following maximum values $U_O = 7.5 \text{ V}$ $I_O = 173 \text{ mA}$ $P_O = 325 \text{ mW}$ Characteristic: linear
or:	For connection to a certificated intrinsically safe circuit with following maximum values (current addition) $U_i = 7.5 \text{ V}$ $I_i = 173 \text{ mA}$ $P_i = 325 \text{ mW}$ Max. permissible external capacitance $C_O = 260 \text{ }\mu\text{F}$ Max. permissible external inductance $L_O = 1.4 \text{ mH}$
Contact circuits	In intrinsically safe level of protection: II 2 G EEx d [ib] IIB T4 with following maximum values $U_O = 15 \text{ V}$ $\hat{I}_O = 44 \text{ mA}$ $\hat{P}_O = 165 \text{ mW}$ Characteristic: linear Max. permiss. external capacitance $C_O = 2.4 \text{ }\mu\text{F}$ Max permiss. external inductance $L_O = 70 \text{ mH}$
Power supply circuits	In intrinsically safe level of protection: II 2 G EEx d [ib] IIB T4 with following maximum values $U_O = 15 \text{ V}$ $I_O = 360 \text{ mA}$ $P_O = 1.35 \text{ W}$ Characteristic: linear Max. permiss. external capacitance $C_O = 2.4 \text{ }\mu\text{F}$ Max permiss. external inductance $L_O = 0.2 \text{ mH}$
EU type test certificate	TÜV 97 ATEX 1176



As the control device contains batteries, it must be opened only outside of any area subject to explosion hazards.

13.3 Operating Device

EU test sample certificate	TÜV 97 ATEX 1175
Supply circuit I + II	In intrinsically safe level of protection: II 2 G EEx ib IIB T4 Only for connection to a certificated intrinsically safe circuit with the following maximum values: $U_i = 15 \text{ V}$ $I_i = 360 \text{ mA}$ $P_i = 1.35 \text{ W}$ The effective internal capacitance and inductance are negligibly small.
Data circuits	In intrinsically safe level of protection: II 2 G EEx ib IIB T4 Only for connection to a certificated intrinsically safe circuit with the following maximum values: $U_i = 7.5 \text{ V}$ $I_i = 173 \text{ mA}$ $P_i = 0.94 \text{ W}$ The effective internal capacitance and inductance are negligibly small.

13.4 Printer DR-295 FDW

Part designation	DR-295 FDW
Printer model	7 needle-shuttle-printer
Symbols per line	42-35
Print speed	about 2.3 lines/s
Print width	65mm
Paper feed	platform for single pages min. 80 mm x 80 mm max. 182 mm x 257 mm
Interface	serial V.24 with FDW-report
voltage supply	24V DC $\pm 10\%$

13.5 Printer DR-298 FDW

Part designation	DR-298 FDW
Printer model	7 needle-shuttle-printer
Symbols per line	42-35
Print speed	about 2.3 lines/s
Print width	65mm
Paper feed	platform for single pages min. 80 mm x 80 mm max. 182 mm x 257 mm
Interface	serial V.24 with FDW-report
voltage supply	24V DC $\pm 10\%$

13.6 Printer EPSON TM-U295

Part designation	TM-U295 flatbed receipt printer
Printing method	Shuttle Dot Matrix, 7-needle
Symbols per line	42 or 35, (65mm)
Symbols per inch	13,5/16,2
Print speed	about 2.3 lines/s
Print width	65 mm
Paper feed	platform for single pages min. 80 mm x 80 mm max. 182 mm x 257 mm
Printer ribbon	ERC-27
Paper thickness	0,09 to 0,25 (0,22 when including a copy)
Interface	serial V.24 with FDW protocol
Voltage supply	24V DC $\pm 10\%$
Power input	0,6 A
Weight and dimensions	180(W) x 190,5(D) x 101,5(H), 1,6 Kg
EMI Standard	EC conformity mark, EN55022 Class B, EN55024
Safety	EN60950

14 Miscellaneous Information

14.1 Abstract from ElexV (§12)

Inspections

(1) The operator must arrange for the electrical devices to be inspected for the proper condition of their assembly, installation and operation by a qualified electrician or directed and supervised by a qualified electrician.

1. before first use
2. in specific time intervals.

The periods must be calculated so that resulting deficiencies, which must be assumed, are determined in a timely manner. The inspections according to sentence 1 no. 2 must be carried out every three years. They may be omitted if the electrical devices are constantly monitored by a responsible engineer.

(2) During the inspection, related standard engineering practices must be followed.

(3) If requested by the relevant authority, a test book with specific entries must be kept.

(4) In case of damage or in special cases, the regulating authority may arrange a special inspection by an expert. The operator must arrange that an assigned inspection, executed according to sentence 1, is carried out.

Abstract from Bundesarbeitsblatt 3/1997 page 101
(German Labor Bureau Sheet 3/1997)

14.2 Extract from the Preliminary Certificate

- The preliminary test establishes whether the component conforms to the requirements of the type approval. It can be submitted for calibration in conjunction with a pre-tested measuring apparatus in a measuring system set up according to weights and measures legal requirements and operated by a weights and measures authority.
- The figure (number of disturbance pulses) found in the test step "Testing the pulse input" (test step no. 2) is only used for testing the function of the pulse monitoring circuit. The setting of the number of permissible disturbance pulses which is dependent on the meter and pulse transmitter must be determined before calibration according to W & M instruction 5 (EA 5) and saved in system parameter **3.3.1.3**.

The number of permissible disturbance/error pulses can be determined from the meter nominal values based on the following formula:

$$P_{\text{dper}} \leq 0.01 * V_{\text{min}} * P_{\text{pul}}$$

where:

P_{dper} = max. permissible number of disturbance/error pulses

P_{pul} = number of pulses per unit volume (meter name-plate)

V_{min} = lowest measurement/discharge amount (meter name-plate)



The lowest measured volume must not be less than 200 liters.

Parameter settings for a minimum measurement volume of $V_{\text{min}} = 200 \text{ l}$

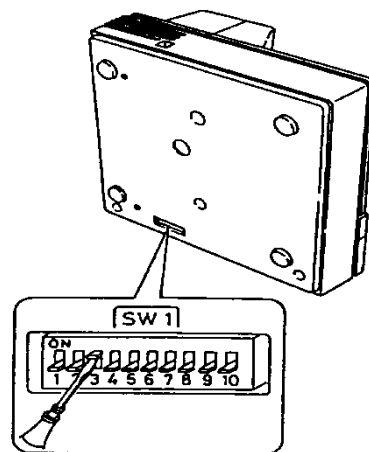
Pulse Rating Parameter 3.3.1.1	Error Pulse Limit Parameter 3.3.1.3
23.715 Pulses/ℓ	47
11.858 Pulses/ℓ	23
10.000 Pulses/ℓ	20
6.568 Pulses/ℓ	13
5.714 Pulses/ℓ	11
5.517 Pulses/ℓ	11

14.3 DIL Switch Settings for DR-290/DR295



The following factory settings are to be checked on the printer in the event of a fault:

Switch	Position	Function
SW-1	ON	Ignore transmission errors
SW-2	OFF	512 Byte data buffer
SW-3	ON	Handshake XON/XOFF
SW-4	OFF	8 Bit
SW-5	OFF	No Parity
SW-6	ON	Even Parity
SW-7	OFF	9600 Baud
SW-8	OFF	
SW-9	OFF	
SW-10	ON	Transparent mode ON



14.4 DIL switch settings for DR-298-FDW

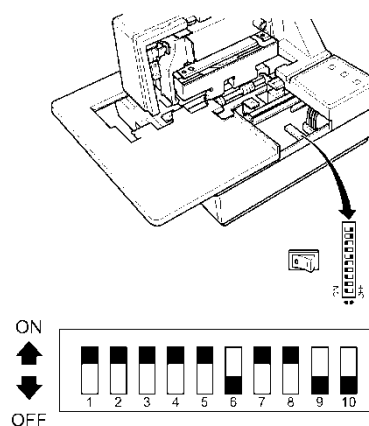
The switches that determine the operating mode of the DR-298 are located in the interior of the unit (see manual).



The following factory settings are to be checked on the printer in the event of a fault:

Switch	Position	Function
SW-1	ON	9600 Baud
SW-2	ON	
SW-3	ON	
SW-4	ON	No Parity
SW-5	ON	
SW-6	OFF	Handshake XON/XOFF
SW-7	ON	Printer mode Star
SW-8	ON	
SW-9	OFF*	Pin 6 Reset inactive
SW-10	OFF*	Pin 25 Reset inactive

* Any setting is valid



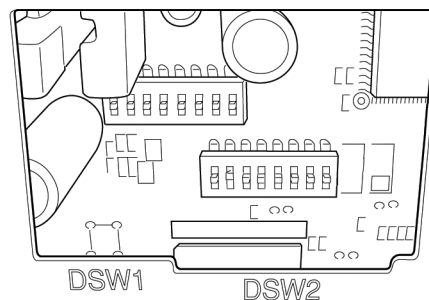
14.5 DIL Switch Settings of TM-U220

The switches that determine the operating mode of the TM-U220 are located behind the flap at the bottom of the device (see manual).



The following factory settings are to be checked on the printer in the event of a fault:

DSW1	Position	Function
1	OFF	Transmission error: Print “?”
2	ON	40 Byte data buffer
3	ON	Handshake XON/XOFF
4	OFF	8 Bit
5	OFF	No parity
6	OFF	Uneven parity
7	OFF	9600 Baud
8	ON	Busy: Buffer full & offline



DSW2	Position	Function
1	ON	42/35 characters / line
2	OFF	Autocutter
3	OFF	- - -
4	OFF	Serial interface activated with DIP switch
5	OFF	- - -
6	OFF	Overwriting of flash memory inactive
7	OFF	Pin 6 Reset inactive
8	ON	Pin 25 Reset inactive

14.6 DIL switch settings TM-U295

From MultiFlow version 3.45[3.45]DE and higher you can connect the TM-U295 to the MultiFlow.

The switches to set the operating mode of the TM-U295 are located on the bottom of the unit (see manual).

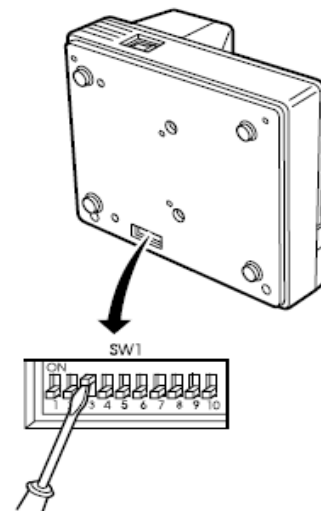
A special protocol is used to control the TM-U295 and this is required to monitor some basic functions of the printer. This is activated automatically as soon as the TM-U295 printer is selected in menu item 3.2.1 of the MultiFlow. If the printer is operated without this protocol or with a FDW converter, you must select the printer type "DR-295" instead of "TM-U295"!

14.6.1 MultiFlow versions up to V3.48



For MultiFlow versions without a separate option to set the number of data bits (up to version 3.48) set the data format to 7E1 as follows.

DSW1	Position	Function
1	OFF	Transfer error: "?" print
2	OFF	512 byte data buffer
3	ON	Handshake XON/XOFF
4	ON	7 bits
5	ON	Parity used
6	ON	Even parity
7	OFF	9600 baud
8	OFF	
9	OFF	No pin 6: Reset signal
10	OFF	No pin 25: Reset signal



Make the following settings (up to version 3.48) to the MultiFlow before setting the electronic seal in order to operate the TM-U295 correctly (without FDW converter):



Settings to the MultiFlow:

Menu option	Value to be entered	Meaning
3.2.1 Printer selection	7	TM-U295
3.2.6.1 LDT protocol	0	OFF
3.2.4 Parity check	1	Even parity

14.6.2 MultiFlow versions from V3.49



For MultiFlow versions with a separate option to set the number of data bits set the data format to 8E1 as follows. This allows the use of special characters even in secure data transfer.



The printer is factory-set for connection to the Multi-Flow.



No further adjustments need to be made to the printer.

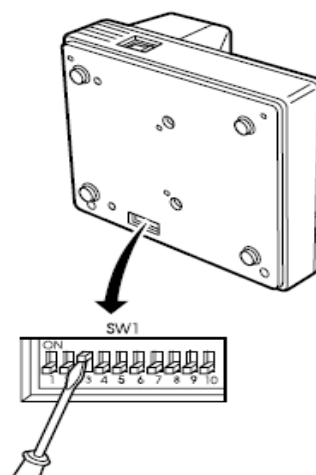


The following factory settings are to be checked on the printer in the event of a fault. The switches to set the operating mode of the TM-U295 are located on the bottom of the unit.



The following factory settings are to be checked at the printer:

DSW1	Position	Function
1	OFF	Transfer error: "?" print
2	OFF	512 byte data buffer
3	ON	Handshake XON/XOFF
4	OFF	8 bits
5	ON	Parity used
6	ON	Even parity
7	OFF	9600 baud
8	OFF	
9	OFF	No pin 6: Reset signal
10	OFF	No pin 25: Reset signal



Make the following settings to the MultiFlow before setting the electronic seal in order to operate the TM-U295 correctly (without FDW converter). These are available from the SW Version 3:49 [3:49] DE and allow the use of special characters, even with secure data transmission.



Settings of the MultiFlow.

No.	Name	Setting	Meaning
3.2.1	Printer Selection	7	7: TM-U295
3.2.2	Interface Type	0	RS232
3.2.3	Transfer Rate	0	9600 baud
3.2.4	Parity Check	1	1: Even Parity
3.2.5	Lines per Page	57	Number of lines on a page
3.2.6.1	Protocol	0	FDW protocol inactive
3.2.9	Data bits	1	1: 8bits

14.7 TALLY printer MIP 480 – Settings and parameterization

The TALLY printer menus and functions are not shown on a display but printed out as guides. These print-outs are controlled by the commands listed beneath the printer keys <NEXT> <PREVIOUS> <ALT> and <SETUP/EXIT>.



Connect the printer to the power supply using a 10 A cable with a width of at least 1,5 mm² and secure the connection.



Important !

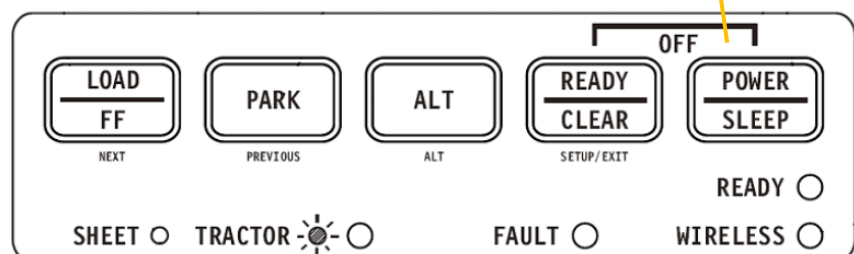
Do not connect the printer to the MF-EPS !



Open the printer cover first; otherwise the printed text will not be visible.



14.7.1 Printer keys



Please first print out the preselected setup-values in order to get an overview of the settings before parameterizing the printer. The most important parameters in this case are:

- Baud rate: <9600>.
- Parity: <EVEN>
- Data bits: <8Bit>.



These parameters may be printed out as follows:
Press the **POWER/SLEEP** key and immediately afterwards press the **ALT** (Alt) key. If you wish to make changes to the setting of these parameters please consult the following chapters.

14.7.2 Changing the parity in the “INSTALL” Setup mode

Activate Setup mode



Press the **POWER/SLEEP** key for one second (**Power on**) and **immediately afterwards** press the **READY/CLEAR** (SETUP/EXIT) key for one second.

- ▶ Insert paper (automatic paper feed)
 - ▶ Insert the paper again afterwards,
 - ▶ Printing starts automatically.
 - ▶ Five lines (up to line “SETUP/EXIT”) will need to be printed. Please compare the sample print-out (1) below.
 - ▶ In the next section, print up to line “FUNCTIONS” and “MACRO”. Please compare the sample print-out (2) below.

Set-Up Mode	
Buttons	Set-Up Action
1 NEXT	Move cursor Down to the next Function or Value
PREVIOUS	Move cursor Up to the next Function or Value
ALT-NEXT	Select the Option or Value and Move cursor Right
ALT-PREVIOUS	Select the Option or Value and Move cursor Left
SETUP/EXIT	Select the Option or value and Move to SAVE&EXIT
2 FUNCTIONS	
MACRO	

Sample print-out

Choose the “INSTALL” function



After the print-out, press the **LOAD/FF** (NEXT) key to access the “INSTALL” selection in Setup mode.



Press the **ALT** + **LOAD/FF** (NEXT) key to select the “INSTALL” function.

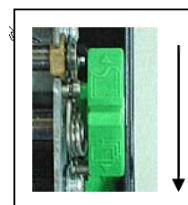
- ▶ Press the 6 x **LOAD/FF** (NEXT) key six times until “PARITY” is printed out.

- ▶ Press the **ALT** + **LOAD/FF** (NEXT) key to set “*PARITY*” to **<None>**.
- ▶ To set “*PARITY*” to **<Even>**, press the **LOAD/FF** (NEXT) key until “*EVEN*” is printed out.
- ▶ To save this value and exit, press the **READY/CLEAR** (SETUP/EXIT) key. In order to confirm, the new value was successfully implemented, “*Save and exit*” will be printed out afterwards.
- ▶ Press the **ALT** + **LOAD/FF** (NEXT) key to exit the setup mode.

14.7.3 Switch from continuous-forms paper to single sheet



Open cover and switch green paper select lever on the right side to “single sheet”.



14.7.4 Changing the form length in “MACRO” Setup mode



Only change this option when not printing in 12 inch format!

Activate Setup mode



Insert paper.



Press the **POWER/SLEEP** key and release after one second (**Power on**), press the **READY/CLEAR** (SETUP/EXIT) key immediately afterwards and also release after one second.

Select the “MACRO” function



Wait until printer has stopped printing and press the **ALT** + **LOAD/FF** (NEXT) key to select the “*MACRO*” function.

Print menu form length

- ▶ Press the **LOAD/FF** (NEXT) key eight times until “*FORM LENGTH*” is printed out.

Change setting from 11 inch to 12 inch

- ▶ Press the **ALT** + **LOAD/FF** (NEXT) key until “*12 inch*” is printed out.

End the “MACRO” function



Press the **READY/CLEAR** (SETUP/EXIT) key



Exit Setup mode

▶ Press the **READY/CLEAR** (SETUP/EXIT) key

14.7.5 MultiFlow parameterization

- Parameter 3.2.1. Printer selection : FX
- Parameter 3.2.2. Interface : RS232
- Parameter 3.2.3. Baud rate : 9600
- Parameter 3.2.4. Parity : Even
- Parameter 3.2.6.1. FDW protocol : no
- Parameter 3.2.9. Data bits : 8 bit

14.8 Printer TM-U295 - Information on DC converter DCV 75-24-24



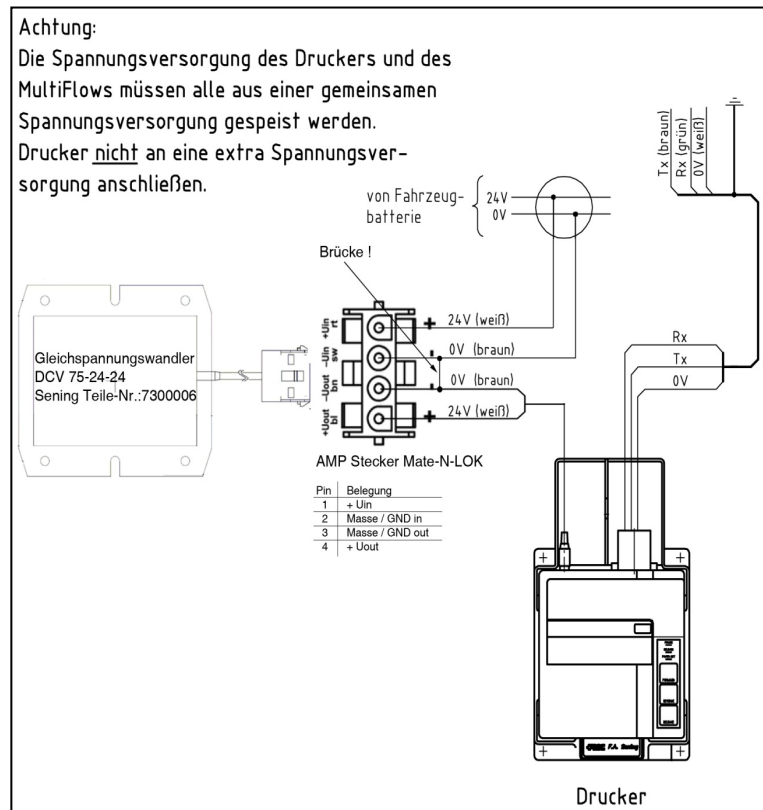
In some vehicles using an Epson TM-U295 printer, a sudden voltage drop (e.g. when starting the vehicle) can lead to a voluntary shut-down in order to protect the printer hardware. Afterwards the printer needs to be powered off and on again.



In order to circumvent this, it is recommended to use a DC converter: DCV 75-24-24, Sening part no 7300006.



The DC converter is connected as demonstrated below:



Since the input is electrically isolated from the output, the negative cables need to be bridged in order for the setup to function correctly



Conformance to the EU guideline 89/336/EWG and to the German EMC regulation (EMVG)

14.9 Program versions

The following MultiFlow properties and functions have either been changed or are appearing for the first time:

14.9.1 Version 2.00

- Support of alternative taxes for Heating Oil (**UK version only!**)
- Full electronic hose selection
- Monitoring overfill probe
- Operation without temperature sensor possible

- Monitoring product and additive load
- Automatic interruption of discharge when no flow is detected (timeout)
- Trip reports on chip cards, digital office link
- Support for a second currency, e.g. the EURO
- TMC communication, tour planning on the basis of the TDL specification
- Maintenance of password secrecy, particularly of seal passwords
- Storage of service personnel identifier in the electronic calibration seal
- Printer control of the DR-295-FDW, paper ejection in any direction
- Form control, print form elements depending on actual seal status
- Form control, new form elements ("Totaliser Block 2", "Calibration remark")
- Parameter check with error report
- Expanded update function

14.9.2 Version 2.20

- Introduction of a new printer (DR-298)
- Adaptations to the GVLx_xM valve grouping for flow control
- Display and evaluation of the electronic W & M seal
- Corrections to the recording of low flow rates and the presentation of volume to several decimal places
- Adaptation of the pre-sets for product densities in accordance with PTB Memo 109, 5/99

14.9.3 Version 3.00

- Remote control of the discharge (start/stop, volume/flow display) via RF
- Limit monitoring indicator via RF
- Dead man's switch via RF
- Interface to on-board computers from third-party manufacturers (via ancillary equipment)

14.9.4 Version 3.04

- Evaluation of pulse errors depending on the actual flow rate

14.9.5 Version 3.10

- Support of EPSON-FX compatible printer
- Operator advice for product changes
- Free assignment of hose sets to the individual products

14.9.6 Version 3.15

- Support of the metering of additives after the measuring system, i.e. the additive is separately shown on documents (delivery receipt, invoice, trip report etc.)
This function is currently only active in the Belgian version.
- Support of self loading and product transfer between the individual chambers in a vehicle (product transfer) incl. receipts, saving in the logbook, documentation in the events report etc.
This function is currently only active in the UK version.

14.9.7 Version 3.20

- In the control variants with flow control the changeover from low to high flow now takes place either with dependence on the flow quantity or the flow rate.
- The automatic adaptation of the preset switch-off (parameter **31843** – **31845**) can be switched off with the new parameter **31846**.
- From version 3.20 on, the MultiFlow offers the option of querying the payment status after an invoice has been printed.

14.9.8 Version 3.30

- Support of a new controller variant for the assembly of measurement systems with turbine
- Logbook entry during modification of date and/or time
- Support of a 64KByte chip card for parameters and data
- Support of the **Multi-IO** for expansion of the inputs and outputs
- The use of an ASCII printer driver enables e.g. the connection of a laptop for the storage and archiving of parameter lists, log books, etc.
- From Version 3.30 on, new auxiliary displays for density, meter factor and mass are available during the discharge.

14.9.9 Version 3.40

- Suppression of manual discharges during EMIS or TMC operation
- Logbook: matching of the START and STOP times to the actual product flow
- Measurement system with turbine: New parameters for maximum flow and residual volume in each product register
- Operation of the MultiFlow without printer
- Delivery receipt: New form elements for totals status and average flow rates
- Expansion of the logbook capacity

- Printout of V0 / VT on the delivery receipt can take place in a product-dependent manner

14.9.10 Version 3.45

- Transfer of the totalizer data to the EMIS interface
- Default value of pulse type changed from PNP to THS
- Printer driver: No subscripts possible
- New parameter: **3.1.4.4.1** (Default delivery pre-set)
- The sensor type (menu 3314) is reset to the default type (*THS type*) after a factory reset
- Request for totalizer data via EMIS is also possible during an ongoing delivery. After an unplanned delivery the MultiFlow transfers the actual delivery data to the EMIS.
- Printer management revised for use of two MultiFlows and simultaneous actuation of the Print key
- VAT is calculated even if the cumulative block is printed out before the product block
- Detection of defective reference meters
- If you press STOP to exit a menu selected with ENTER or START you do not return to the main menu or to the last menu selected with a number. You go back only to the previous menu
- Time can only be changed after password request
- Detection of RTC readout error
- If a product is selected whose price factor has been set to 0 (fixed price) there is no need to enter a delivery quantity in the input window
- If the print receipt includes details of the meter status before the start of the delivery, the correspondingly relevant unit for the delivered product is taken into account now.
- Control of EPSON TM-U295
- No double product entry in the logbook after cancelled delivery

14.9.11 Version 3.48

- Introduction of scale prices
- Summary of orders transferred by the OBC
- Printer selection no longer completely under seal protection. Only the "No printer" option requires the electronic seal to be broken
- New CEF telegram (TMC protocol) included for transfer of additional product information to the OBC after delivery
- Optional request for "Receipt copy": When the request is active, user is asked after each receipt printout whether another copy is required.

- Flushing volume: Parameter **3.1.5.8** has been extended. The previous parameter for the minimum flushing volume has been changed from **3.1.5.8** to **3.1.5.8.3**. Further additions are: **3.1.5.8.1** now offering a choice of flushing products from the product list, specification of the standard flushing volume under **3.1.5.8.2** and activation of a special flushing monitor in OBC mode under **3.1.5.8.4**.
- Separate delivery note and invoice numbers: The newly introduced parameter **3.1.9.1** enables the use of different receipt numbers for delivery notes and invoices. These can be pre-set under **3.1.9.2 – 4**. If two numbering cycles are used, the invoice and delivery note numbers are respectively prefixed by different identifiers (e.g. Invoice: R012345, Delivery note L012345). If the separate numbering cycles are activated it is not possible for the MultiFlow to produce an invoice for a receipt originally printed as a delivery note.

14.9.12 Version 3.49

- The number of data bits can be specified irrespective of the parity setting. The following combinations are supported: 8N1, 8E1, 8O1, 7N2, 7E1 and 7O1.

14.9.13 Version 3.50

- Revision of the output of the cumulative statuses on the receipt
- Specification of the minimum Belgian receipt layout changed
- Revision of date setting
- Data bit changes can also be adopted without restart
- Modification of the "Blow down" function in the UK variant
- Revision of printer allocation in the case of multiple measuring systems with TM-U295
- Stop delivery if temperature falls below the minimum threshold
- Optional additional details of comp. weight in product block
- MultiFlow->EMIS data transfer

14.9.14 Version 3.54

- EPSON TM-U295 defined as default printer with 8E1 format
- Receipt elements "Compartment number", "Delivery pre-set" and "Order number" added
- Support of the EMIS
- Support of ethanol mixes
- Error message on printer in the case of defective display communication
- IO test extended in the service menu

- IO status display during delivery
- Maximum additive mixing ratio increased
- Support for the external IO interface incl. user-specific links and additional hose paths
- Support of the external sensor interface including user-specific configuration, alarm messages and sensor monitoring
- Cyrillic characters can be selected using: "+/-" and "0"
- Pre-set modification enable/disable
- Configurable automatic sending of delivery data to the EMIS
- Minimum waiting time for OBC connection via CAN bus
- Error message on printer in the case of defective display communication
- (De)activation of automatic sending of delivery data to the EMIS

14.9.15 Version 3.59

- Check document numbering sequence before start of print-out
- New product groups RME and SME
- Take into account start and end time for unmeasured discharges
- Start of a trial lift for the additive pump possible via diagnostic menu 4.3.1. During the trial lift, details of the number of lifts to be run through and total quantity of additive discharged are displayed.
- Transfer sensor logbook data to EMIS
- Possible to extend order number field and input a standard value. In addition the protection class (supervisor or driver) for access to the standard value can be revised.
- Printing is possible via the CAN-Bus
- Control of the MFIO2 to monitor both interface inputs is also possible with deactivated connections and without additional hose routes. Detected changes to condition, if these have occurred, will be stored with the corresponding GPS co-ordinates in the log book.
- Problem with receipt of discharge orders from EMIS when electronic seal is set resolved.
- Problem with second discharge stop and use of 2 full hoses resolved.
- Adjustable protection level for density input
- Revision of time synchronization with EMIS
- Umlauts reintroduced in German version
- Optimization of MFIO2 control
- Set currency symbol via EMIS
- Reaction to short-term non-achievability of EMIS implemented
- Partially available delivery note/invoice query for OBC orders removed

- Activation of sensor monitoring no longer subject to supervisor password
- Software revision due to updated hardware components
- Revisions for the operation with MultiControl2 (MC2)
- Optional residue removal query after every product change
- New receipt elements extracted from the sum block available

14.9.16 Version 3.60

- Extended assignment layout for OBC operation
- AS Status Info
- Turbine and Multi-IO support disabled
- The previous form of temperature compensation for mixed products such as E10 is being replaced by the re-evaluation process currently specified.
- Logbook handling revised

14.9.17 Version 3.61

- Transmission of logbook data for EMIS
- Query for MFSI configuration via EMIS

14.9.18 Version 5.00 (MID)

- Separation of calibration-relevant and non calibration-relevant program sections
- Introduction of download logbook (Audit-Trail)
- Introduction of scale prices
- Summary of orders transferred by the OBC
- Option of residue discharge via EPE2
- Printer selection no longer completely under seal protection. Only the "No printer" option requires the electronic seal to be broken.
- New CEF telegram (TMC protocol) included for transfer of additional product information to the OBC after delivery
- Optional request for "Receipt copy": When the request is active, user is asked after each receipt printout whether another copy is required
- Flushing volume: The parameter **3.1.5.8** has been extended. The previous parameter for the minimum flushing volume has been changed from **3.1.5.8** to **3.1.5.8.3**. Further additions are **3.1.5.8.1** now offering a choice of flushing products from the product list, specification of the standard flushing volume under **3.1.5.8.2** and activation of a special flushing monitor in OBC mode under **3.1.5.8.4**.

- Separate delivery note and invoice numbers: The newly introduced parameter **3.1.9.1** enables the use of different receipt numbers for delivery notes and invoices. These can be pre-set under **3.1.9.2 – 4**. If two numbering cycles are used, the invoice and delivery note numbers are respectively prefixed by different identifiers (e.g. Invoice: R012345, Delivery note L012345). If the separate numbering cycles are activated it is not possible for the MultiFlow to produce an invoice for a receipt originally printed as a delivery note.
- The number of data bits can be specified irrespective of the parity setting. The following combinations are supported: 8N1, 8E1, 8O1, 7N2, 7E1 and 7O1.

14.9.19 Version 5.01 (MID)

- Revision of the output of the cumulative statuses on the receipt
- Specification of the minimum Belgian receipt layout changed
- Revision of date setting
- Data bit changes can also be adopted without restart
- Revision of printer allocation in the case of multiple measuring systems with TM-U295
- Stop delivery if temperature falls below the minimum threshold
- Optional additional details of comp. weight in product block
- Modification of compartment flushing
- EPSON TM-U295 defined as default printer with 8E1 format
- Receipt elements "Compartment number", "Delivery pre-set" and "Order number" added
- Support of the EMIS
- Support of ethanol mixes
- Error message on printer in the case of defective display communication
- IO test extended in the service menu
- IO status display during delivery
- Maximum additive mixing ratio increased
- Support for the external IO interface incl. user-specific links and additional hose paths
- Support of the external sensor interface including user-specific configuration, alarm messages and sensor monitoring
- Cyrillic characters can be selected using: "+/-" and "0"
- Pre-set modification enable/disable
- Configurable automatic sending of delivery data to the EMIS
- Minimum waiting time for OBC connection via CAN bus

- Error message on printer in the case of defective display communication
- Rectification of problem within the booter housing
- (De)activation of automatic sending of delivery data to the EMIS
- Extended copy control
- Discharge delay

14.9.20 Version 5.05 (MID)

- Modification of status information for 'Residue removal from EPE2' (Menu 8) and status monitoring of the EPE2
- Remediating of problems: output modification in OBD mode
- Revision of status detection of measuring system while output is suspended

14.9.21 Version 5.06 (MID)

- New parameter 3.1.6.8.4 for EPE2 signal inversion

14.9.22 Version 5.07 (MID)

- Checking of sequence of receipt numbers before start of print run
- Problem with scanning of parameters from version 5.00 via chip card remedied
- New product groups RME and SME
- Taking account of start and end time on unmeasured outputs
- Start of a test stroke of the additive pump possible via diagnosis menu 4.3.1. During the test stroke a display shows details of the number of strokes completed and the total volume of additive dispensed.
- Transmission of sensor logbook data for the EMIS
- Extension of the order number field and input of a standard specified value is possible. In addition, the security class (supervisor or driver) can be adapted to provide access to the standard specified value.
- Printing via the CAN bus implemented
- Activation of the MFIO2 to monitor the two interface inputs possible even when links are disabled and without additional hose routings. Detected status changes are, if present, saved with their corresponding GPS coordinates in the logbook.
- Problem with reception of dispensing order from EMIS with activated electronic seal remedied
- Problem with second discharge stop and use of two wet hoses remedied

- Broadcast OPEN in standalone mode if MultiFlow is the printer administrator
- Adjustable protection level for density input
- Revision of time synchronization with EMIS
- Modified vowels ('umlauts') reintroduced in German (DE) version
- Optimization of MFIO2 activation
- Setting of currency symbol via EMIS
- Reaction to short-term non-availability of EMIS implemented
- Partially present delivery note/invoice query removed from OBC orders
- Activation of sensor monitoring is no longer subject to supervisor ID code
- Supplement and modification of residue removal wait display. Adjustment of status details and installation of a filling request function and a direct link to the residue removal menu
- Fill level monitoring via EPE2 and evaluation of measuring system problems when dispensing operation is suspended (interrupted)
- Support of EPE2-A1 added to residue removal control function
- Separate logbook and parameter reset
- Possible query for residue removal after every change of product
- Software adjustment due to modified hardware components
- New assignable elements available, extracted from sum totals block
- Adjustments for operation with the MultiControl2 (MC2)
- Printing via CAN bus

14.9.23 Version 5.08 (MID)

- Modification of logbook access on detection of existing emergency acknowledgments

14.9.24 Version 5.09 (MID)

- Expansion of residue removal control (menu 8) when using an EPE-AI

14.9.25 Version 5.10 (MID)

- Extended assignment layout for OBC operation
- Idle speed measurement

14.9.26 Version 5.11 (MID)

- AS Status Info
- Turbine and Multi-IO support disabled

- The previous form of temperature compensation for mixed products such as E10 is being replaced by the re-evaluation process currently specified.
- Logbook handling revised

14.9.27 Version 5.12 (MID)

- Transmission of logbook data for EMIS
- Query for MFSI configuration via EMIS

15 Software update

15.1 Initial remarks

When updating the software of the MultiFlow (by downloading it or by exchanging the EPROM) the following documents should be at hand, or should have been printed out in advance.

- Parameter list print-out
- Parameter list on a chip card
- Latest printout of electronic W&M seal
- Tour report and event report, if available
- Delivery Note / Invoice

15.2 Software update by download



The following chapter describes how to update the software for a MultiFlow.

With other devices (which support the download feature) proceed similarly.

15.2.1 Hazard notes



EX instructions for construction/installation (e.g. DIN EN 60079-14; VDE 0165) must be strictly followed!

Generally a laptop computer is not explosion proof, and therefore must not be operated within areas liable to explosion (e.g. driver's cab)!

The protection circuits of the Sensing components are laid out for power supply voltage on board of a truck (24V). For safety reasons only laptops powered by batteries (laptop power supply voltage <24V) may therefore be used.

It is strictly prohibited to connect a mains-powered laptop or PC!



Any kind of manipulation, either mechanical or electrical, is prohibited!

EXPLOSION HAZARD

- Instructions on EX signs must be strictly followed.
- It is not permissible to fit any additional components in the housings or in the terminal boxes (e.g. additional terminals), since this would contravene the device approval.
- Any right to claim warranty is waived if these rules are not adhered to.








15.2.2 Required hardware

Connect PC adapter (F. A. Sening Part No. MFLOW-PCADAP) to the printer cable of the Sening system instead of the printer. In addition you need a serial cable with adequate length provided with the following allocations:

9 point SUB-D female plug to connect to the serial port of the laptop (normally COM1)	25 point SUB-D male plug to connect to the PC adapter
Pin 5	Pin 7
Pin 2	Pin 3
Pin 3	Pin 2

Any standard modem cable (1:1 connection, not a cross-over cable!) is equipped with this kind of allocation.

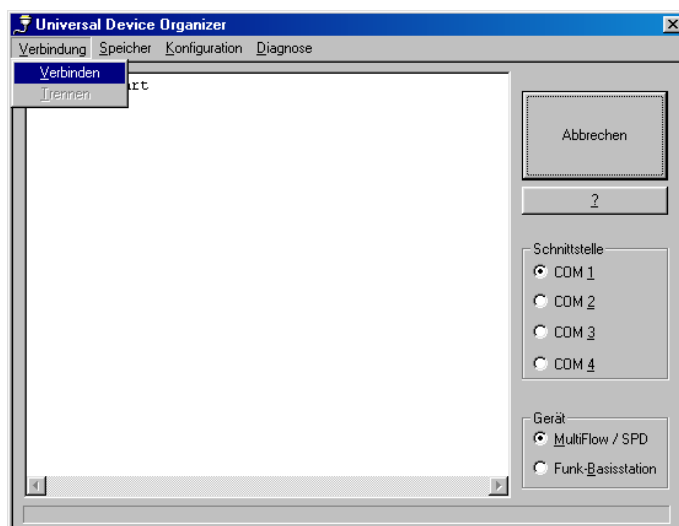
15.2.3 Procedure

-  Check if the system is functioning correctly.
-  Print out a list of all parameters.
-  Save parameter setting to the chip card (parameter **4.5.2.**).
-  Switch off all devices involved (e.g. laptop, NOMIX, SPD, MultiFlow, MultiSeal, EMIS).
-  Disconnect RS232 printer cable from the printer and connect same to the PC adapter at the side marked „MultiFlow“.
-  Connect the earth wire of the PC adapter.
(Connect the black terminal of the PC adapter with the ground cable)
-  Connect the laptop and the PC adapter with the modem cable (as described in chapter 15.2.2.

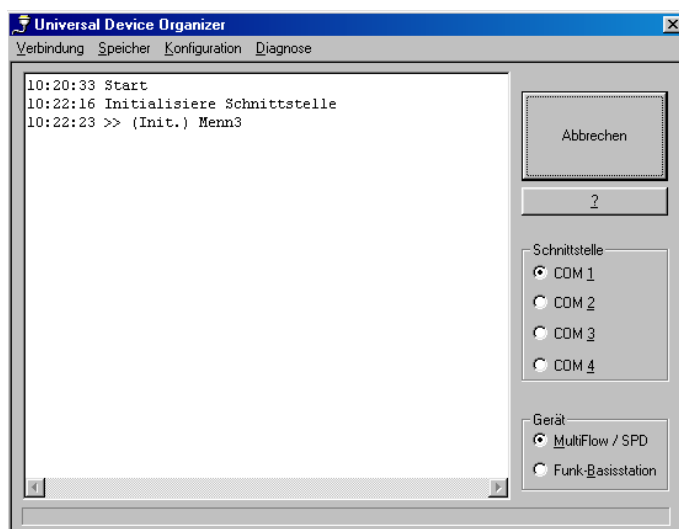


**Place the laptop outside any area with explosion hazards.
Do not operate the laptop with mains voltage, but equipped with
batteries (for laptop power supply voltage <24V) or on board
voltage only.**

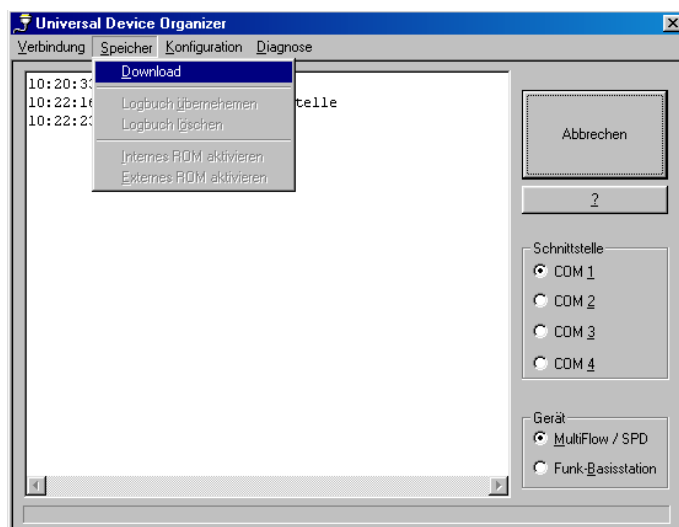
- ☞ Put laptop and Sening components into operation.
- ☞ Start the download software (UDO.EXE) on the laptop. This program is available upon request from our Service department. If software program is not yet installed, install same from the software disk.



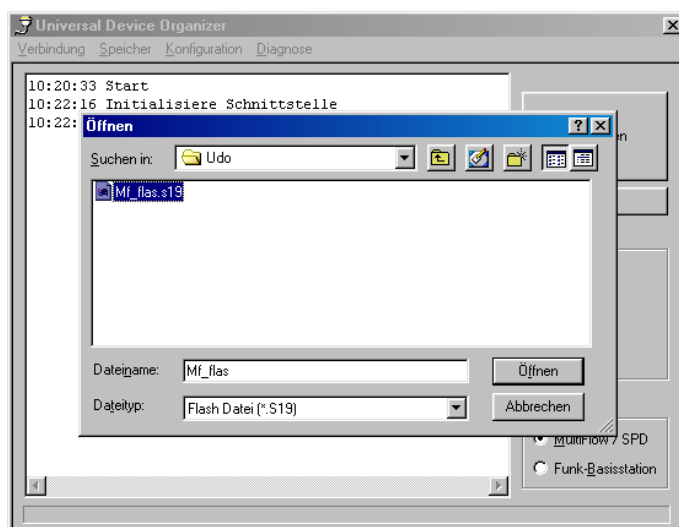
- ☞ Choose the command 'Verbinden' in the 'Verbindung' menu.



- ☞ The download software enables a connection to the device (e.g. MultiFlow) and prepares the download.

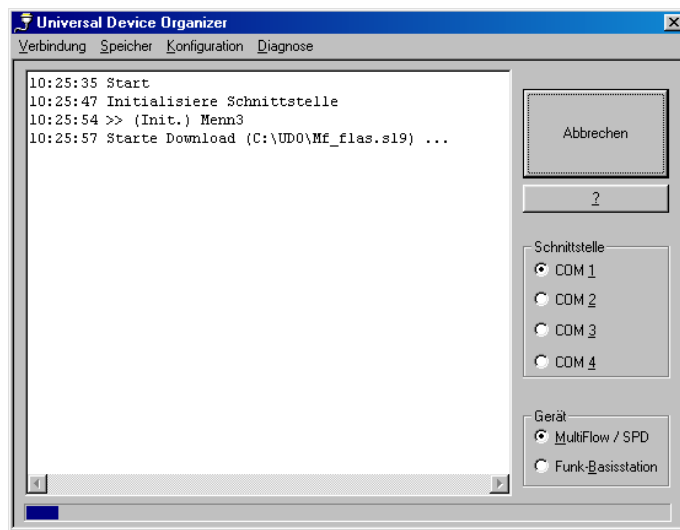


- ☞ Choose the command 'Download' in the 'Speicher' menu.



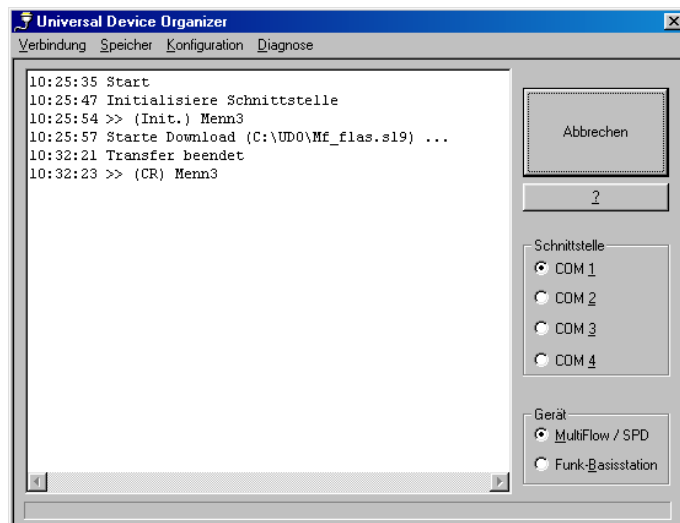
- ☞ The software will open a window to select the file.

- ☞ Select the file for download and click "OK".



Download will take about 5 minutes.

The progress of download is visible through the blue bar at the bottom of the window.



Finish download program by clicking the button 'Abbrechen'.



Switch off MultiFlow, connect printer.



Switch on and initialize MultiFlow (parameter 4.4).



Read out parameter from chip card (parameter 4.5.1).




Print and compare parameter list.


 Print and compare delivery note.


 Set and print out W&M seal.

15.3 Software update by exchanging the EPROM chip

 Check if the system is functioning correctly.


 Print out a list of all parameters.

 Make a note of the receipt ID (parameter **3.1.9**).


 Save parameter setting to the chip card (parameter **4.5.2**).

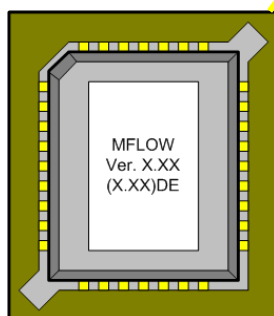
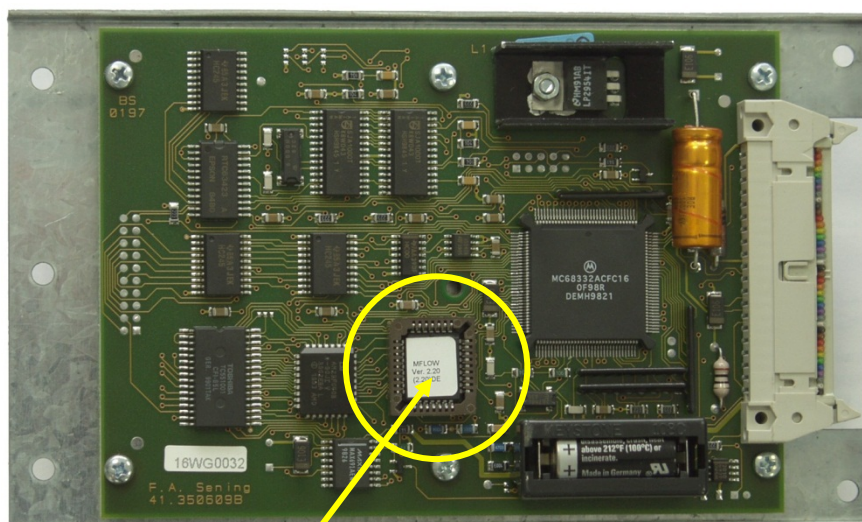
 Switch off the voltage of MultiFlow and printer.

 A1 model: Open round Ex-housing.

 Respective instruction (drawing no. 51.351100, 277)) must be followed strictly!

 A3 model: Open operator terminal, disconnect plug connector.

 Take out electronics mounted on aluminium base plate.
The EPROM is located on the back of the base plate.



Remove old EPROM by using adequate tools only, e.g. EPROM extractor supplied by *RS Components* - part. no. 404-727 or F.A. Sening Part No. 7351002.

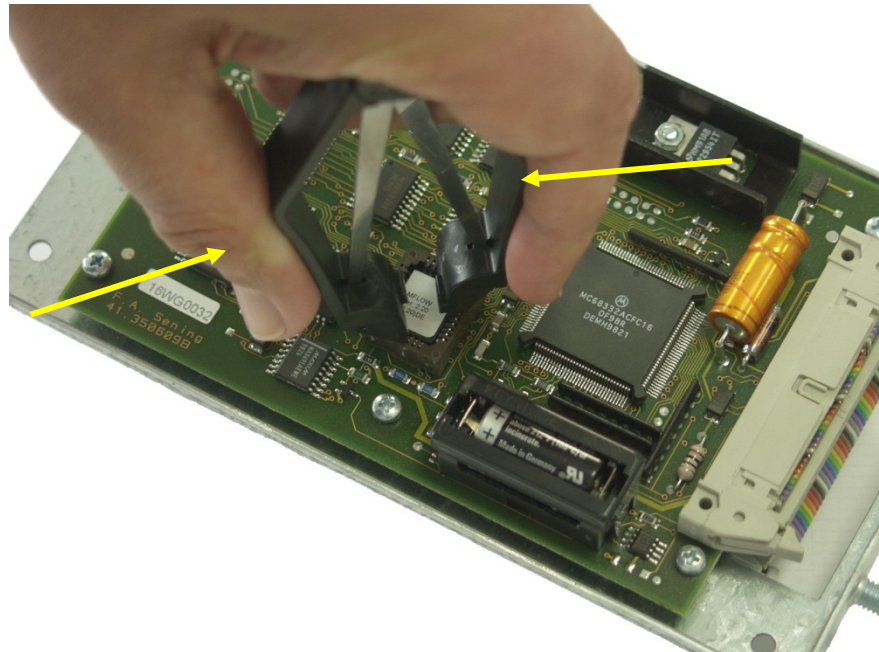


Place both claws of the extractor into the socket, press EPROM extractor slightly against the socket and push the legs of the EPROM extractor with your thumb and index finger (see picture). By means of the self-acting leverage effect the EPROM will then be pulled out automatically.





Note: Do not pull the legs of the tool to remove the EPROM!



Insert the new EPROM in the socket.



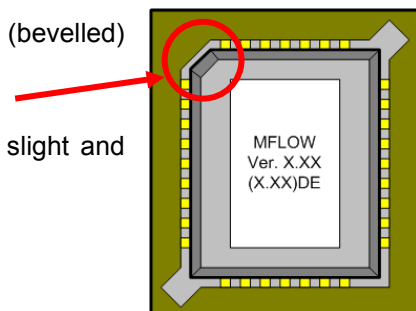
Note the positioning of the flattened (bevelled) corner:

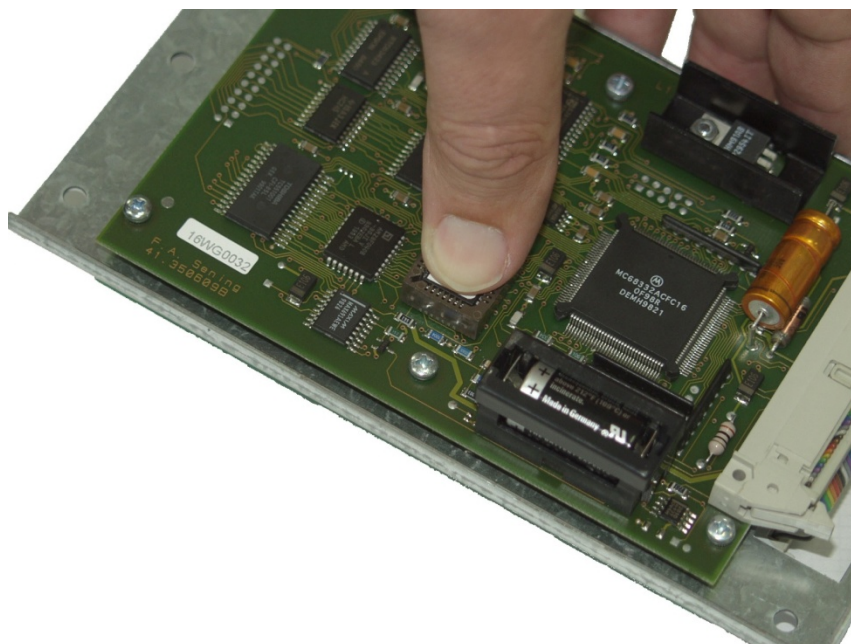


Push EPROM into the socket with a slight and steady movement.



Do not execute any excessive force!

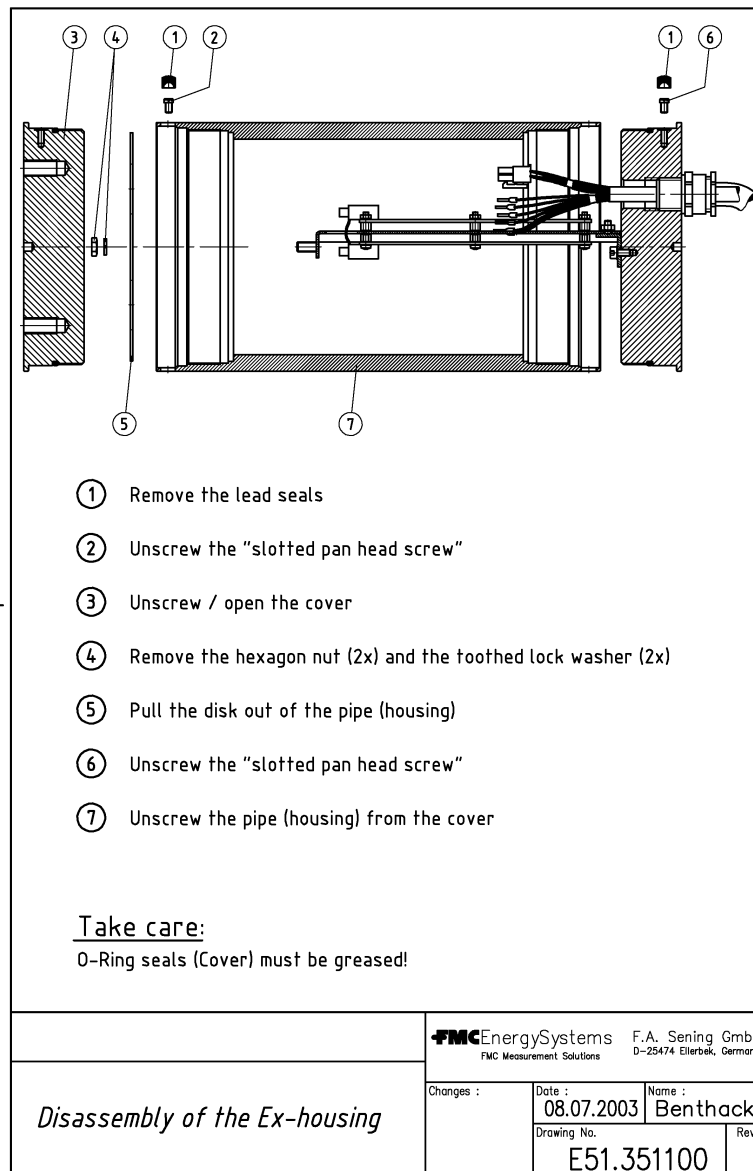




- ☞ Re-assemble the devices (grease threads!).
- ☞ Switch on and initialize MultiFlow (parameter **4.4**).
- ☞ Read out parameter from chip card (parameter **4.5.1**).
- ☞ Check receipt ID (parameter **3.1.9**).
- ☞ Print and compare parameter list.
- ☞ Print and compare delivery note.
- ☞ Set and print out W&M seal.

15.4 Disassembly of the Ex-housing

The correct disassembly of the Ex-housing is described in the following:



Please also refer to page 319.

15.5 Spare Parts



Keep aware of the regulations for the EX protection!

Must be changed AI junction boxes PG glands, so you can only use Ex-approved PG glands.

(for attention see chapter 3 "**General Installation Instructions**" / page 30!)



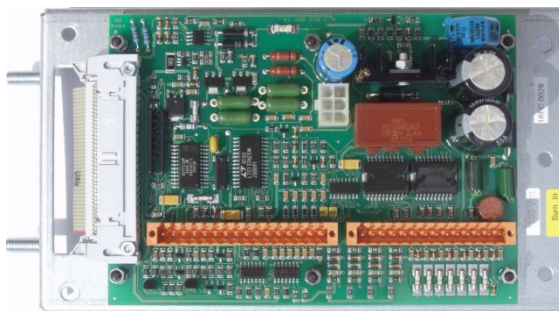
Where the guidelines have evidently not been followed or the installation has not been properly carried out (contravention of applicable regulations), we accept no guarantee when faults occur nor any consequential claims arising from them.



The manufacturer's EMC declaration of conformity is only valid if the system has been installed exactly according to the information provided by the manufacturer (operating and installation instructions).

CPU Order number: AT-351102

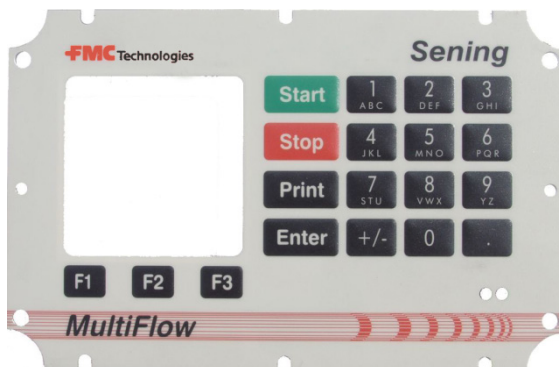
Front side



Back side



Keypad Order number: 350672



Coverage Order number: 350984



16 Character sets available for the MultiFlow

16.1 PC437 character set

This character set is used for the west European and English-speaking area.

Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII
20	32		4D	77	M	7A	122	Z	A7	167	Q	D4	212	E
21	33	!	4E	78	N	7B	123	{	A8	168	Q	D5	213	F
22	34	"	4F	79	O	7C	124	|	A9	169	Q	D6	214	G
23	35	#	50	80	P	7D	125	}	AA	170	Q	D7	215	H
24	36	\$	51	81	Q	7E	126	~	AB	171	Q	D8	216	I
25	37	%	52	82	R	7F	127		AC	172	Q	D9	217	J
26	38	&	53	83	S	80	128	Ç	AD	173	i	DA	218	K
27	39	'	54	84	T	81	129	Ü	AE	174	«	DB	219	L
28	40	(	55	85	U	82	130	é	AF	175	»	DC	220	M
29	41	)	56	86	U	83	131	â	B0	176		DD	221	N
2A	42	*	57	87	W	84	132	ä	B1	177		DE	222	O
2B	43	+	58	88	X	85	133	à	B2	178		DF	223	P
2C	44	,	59	89	Y	86	134	ã	B3	179	|	E0	224	Q
2D	45	-	5A	90	Z	87	135	ç	B4	180		E1	225	R
2E	46	.	5B	91	[	88	136	è	B5	181		E2	226	S
2F	47	/	5C	92	\	89	137	ë	B6	182		E3	227	T
30	48	0	5D	93	]	8A	138	è	B7	183		E4	228	U
31	49	1	5E	94	^	8B	139	ï	B8	184		E5	229	V
32	50	2	5F	95	_	8C	140	î	B9	185		E6	230	W
33	51	3	60	96	`	8D	141	ì	BA	186		E7	231	X
34	52	4	61	97	a	8E	142	Ä	BB	187		E8	232	Y
35	53	5	62	98	b	8F	143	Å	BC	188		E9	233	Z
36	54	6	63	99	c	90	144	É	BD	189		EA	234	[
37	55	7	64	100	d	91	145	æ	BE	190		EB	235]
38	56	8	65	101	e	92	146	Æ	BF	191		EC	236	^
39	57	9	66	102	f	93	147	ô	C0	192		ED	237	_
3A	58	:	67	103	g	94	148	ö	C1	193		EE	238	
3B	59	;	68	104	h	95	149	ò	C2	194		EF	239	
3C	60	<	69	105	i	96	150	û	C3	195		F0	240	
3D	61	=	6A	106	j	97	151	ù	C4	196		F1	241	
3E	62	>	6B	107	k	98	152	ÿ	C5	197		F2	242	
3F	63	?	6C	108	l	99	153	ö	C6	198		F3	243	
40	64	@	6D	109	m	9A	154	Ü	C7	199		F4	244	
41	65	A	6E	110	n	9B	155	ç	C8	200		F5	245	
42	66	B	6F	111	o	9C	156	£	C9	201		F6	246	
43	67	C	70	112	p	9D	157	¥	CA	202		F7	247	
44	68	D	71	113	q	9E	158		CB	203		F8	248	
45	69	E	72	114	r	9F	159		CC	204		F9	249	
46	70	F	73	115	s	A0	160	á	CD	205	=	FA	250	

47	71	G	74	116	t	A1	161	í	CE	206	†	FB	251	✓
48	72	H	75	117	u	A2	162	ó	CF	207	‡	FC	252	η
49	73	I	76	118	ü	A3	163	ú	D0	208	‡	FD	253	²
4A	74	J	77	119	w	A4	164	ñ	D1	209	‡	FE	254	▪
4B	75	K	78	120	x	A5	165	ñ	D2	210	‡	FF	255	
4C	76	L	79	121	y	A6	166	ä	D3	211	‡			

16.2 PC852 character set

This character set is used for the middle European and Slavonic language area.

Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII
20	32		4D	77	M	7A	122	z	A7	167	ž	D4	212	š
21	33	!	4E	78	N	7B	123	{	A8	168	ē	D5	213	ň
22	34	"	4F	79	O	7C	124	|	A9	169	ē	D6	214	í
23	35	#	50	80	P	7D	125	}	AA	170		D7	215	î
24	36	\$	51	81	Q	7E	126	~	AB	171	ž	D8	216	ě
25	37	%	52	82	R	7F	127	⌘	AC	172	č	D9	217	ĵ
26	38	&	53	83	S	80	128	Ç	AD	173	š	DA	218	ŕ
27	39	'	54	84	T	81	129	Ü	AE	174	«	DB	219	■
28	40	(	55	85	U	82	130	é	AF	175	»	DC	220	■
29	41	)	56	86	V	83	131	â	B0	176	░	DD	221	ĵ
2A	42	*	57	87	W	84	132	ä	B1	177	▒	DE	222	ŭ
2B	43	+	58	88	X	85	133	û	B2	178	▓	DF	223	■
2C	44	,	59	89	Y	86	134	ó	B3	179	|	E0	224	ó
2D	45	-	5A	90	Z	87	135	ç	B4	180	†	E1	225	ß
2E	46	.	5B	91	[	88	136	ł	B5	181	Á	E2	226	ô
2F	47	/	5C	92	\	89	137	ë	B6	182	À	E3	227	ñ
30	48	0	5D	93	]	8A	138	ö	B7	183	Ě	E4	228	h
31	49	1	5E	94	^	8B	139	ö	B8	184	Š	E5	229	ň
32	50	2	5F	95	_	8C	140	î	B9	185	Ĥ	E6	230	š
33	51	3	60	96	`	8D	141	ž	BA	186	||	E7	231	š
34	52	4	61	97	a	8E	142	Ä	BB	187	ſ	E8	232	ŕ
35	53	5	62	98	b	8F	143	Ć	BC	188	ſ	E9	233	ŭ
36	54	6	63	99	c	90	144	É	BD	189	Ž	EA	234	ŕ
37	55	7	64	100	d	91	145	Í	BE	190	Ž	EB	235	ŭ
38	56	8	65	101	e	92	146	í	BF	191	ſ	EC	236	ŭ
39	57	9	66	102	f	93	147	ô	C0	192	ſ	ED	237	ŷ
3A	58	:	67	103	g	94	148	ö	C1	193	ſ	EE	238	ſ
3B	59	;	68	104	h	95	149	Ĺ	C2	194	ſ	EF	239	ſ
3C	60	<	69	105	i	96	150	İ	C3	195	ſ	F0	240	-
3D	61	=	6A	106	j	97	151	Š	C4	196	-	F1	241	~
3E	62	>	6B	107	k	98	152	Š	C5	197	ſ	F2	242	~
3F	63	?	6C	108	l	99	153	Ö	C6	198	Ä	F3	243	~
40	64	@	6D	109	m	9A	154	Ü	C7	199	ä	F4	244	~

Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII
41	65	A	6E	110	n	9B	155	ŧ	C8	200	Ł	F5	245	§
42	66	B	6F	111	o	9C	156	ț	C9	201	Ŧ	F6	246	÷
43	67	C	70	112	p	9D	157	ł	CA	202	ł	F7	247	
44	68	D	71	113	q	9E	158	x	CB	203	ŧ	F8	248	°
45	69	E	72	114	r	9F	159	č	CC	204	Ŧ	F9	249	ˆ
46	70	F	73	115	s	A0	160	á	CD	205	=	FA	250	•
47	71	G	74	116	t	A1	161	í	CE	206	†	FB	251	Ů
48	72	H	75	117	u	A2	162	ó	CF	207	☒	FC	252	Ř
49	73	I	76	118	v	A3	163	ú	D0	208	đ	FD	253	ř
4A	74	J	77	119	w	A4	164	ř	D1	209	Đ	FE	254	▪
4B	75	K	78	120	x	A5	165	a	D2	210	Ď	FF	255	
4C	76	L	79	121	y	A6	166	ž	D3	211	Ě			

16.3 PC866 character set

This character set contains Cyrillic characters.

Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII
20	32		4D	77	М	7A	122	z	A7	167	э	D4	212	Е
21	33	!	4E	78	Н	7B	123	{	A8	168	и	D5	213	Ф
22	34	"	4F	79	О	7C	124	!	A9	169	й	D6	214	Ц
23	35	#	50	80	Р	7D	125	}	AA	170	к	D7	215	Ч
24	36	\$	51	81	Q	7E	126	~	AB	171	л	D8	216	Ш
25	37	%	52	82	R	7F	127	⌘	AC	172	м	D9	217	Ъ
26	38	&	53	83	S	80	128	А	AD	173	н	DA	218	Г
27	39	'	54	84	T	81	129	Б	AE	174	о	DB	219	Д
28	40	(	55	85	U	82	130	В	AF	175	п	DC	220	К
29	41	)	56	86	V	83	131	Г	B0	176	р	DD	221	Т
2A	42	*	57	87	W	84	132	Д	B1	177	с	DE	222	Л
2B	43	+	58	88	X	85	133	Е	B2	178	ш	DF	223	И
2C	44	,	59	89	Y	86	134	Ж	B3	179	т	E0	224	Р
2D	45	-	5A	90	Z	87	135	З	B4	180	ф	E1	225	С
2E	46	.	5B	91	Г	88	136	И	B5	181	ц	E2	226	Т
2F	47	/	5C	92	\	89	137	Й	B6	182	ч	E3	227	У
30	48	0	5D	93	]	8A	138	К	B7	183	ш	E4	228	Ф
31	49	1	5E	94	^	8B	139	Л	B8	184	ф	E5	229	Х
32	50	2	5F	95	_	8C	140	М	B9	185	ц	E6	230	Ц
33	51	3	60	96	`	8D	141	Н	BA	186	ч	E7	231	Ч
34	52	4	61	97	a	8E	142	О	BB	187	ш	E8	232	Ш
35	53	5	62	98	b	8F	143	П	BC	188	ф	E9	233	Ъ
36	54	6	63	99	c	90	144	Р	BD	189	т	EA	234	Я
37	55	7	64	100	d	91	145	С	BE	190	т	EB	235	ь
38	56	8	65	101	e	92	146	Т	BF	191	л	EC	236	ъ
39	57	9	66	102	f	93	147	У	C0	192	л	ED	237	э
3A	58	:	67	103	g	94	148	Ф	C1	193	т	EE	238	ю
3B	59	;	68	104	h	95	149	Х	C2	194	т	EF	239	я
3C	60	<	69	105	i	96	150	Ц	C3	195	т	F0	240	ё
3D	61	=	6A	106	j	97	151	Ч	C4	196	т	F1	241	ё
3E	62	>	6B	107	k	98	152	Ш	C5	197	т	F2	242	ё

Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII	Hex	Dez.	ASCII
3F	63	?	6C	108	l	99	153	W	C6	198	F	F3	243	e
40	64	@	6D	109	m	9A	154	b	C7	199	f	F4	244	i
41	65	A	6E	110	n	9B	155	B	C8	200	L	F5	245	j
42	66	B	6F	111	o	9C	156	b	C9	201	f	F6	246	y
43	67	C	70	112	p	9D	157	3	CA	202	F	F7	247	y
44	68	D	71	113	q	9E	158	D	CB	203	F	F8	248	o
45	69	E	72	114	r	9F	159	R	CC	204	F	F9	249	•
46	70	F	73	115	s	A0	160	a	CD	205	F	FA	250	•
47	71	G	74	116	t	A1	161	6	CE	206	F	FB	251	✓
48	72	H	75	117	u	A2	162	B	CF	207	F	FC	252	n
49	73	I	76	118	v	A3	163	r	D0	208	F	FD	253	⊗
4A	74	J	77	119	w	A4	164	A	D1	209	F	FE	254	▪
4B	75	K	78	120	x	A5	165	e	D2	210	F	FF	255	
4C	76	L	79	121	y	A6	166	x	D3	211	F			

17 Address and contact details

Our service department will be happy to assist and can be contacted as follows:



Measurement Solutions

F. A. Sening GmbH

Regentstrasse 1
D-25474 Ellerbek

Tel.: +49 (0)4101 304 - 0 (Switchboard)
Fax: +49 (0)4101 304 - 152 (Service)
Fax: +49 (0)4101 304 - 133 (Sales)
Fax: +49 (0)4101 304 - 255 (Order processing)
E-Mail: info.ellerbek@fmcti.com
Web: www.fmctechnologies.com/seningtp

Appendix A. Drawings and Approvals

Contents of Drawings

Title	No.
Weather-proof housing (AIII version)	E61.350979
Wiring Diagram for MultiFlow (AIII version)	E51.350956
Wiring diagram ADD-Dosage pump (AIII version)	E61.351284
Wiring diagram Dosage pump ADD150 and MultiFlow AI	E51.351988
Wiring diagram Dosage pump ADD350 and MultiFlow AIII	E51.351989
Wiring diagram electronic control + dosage pump + overfill prevention amplifier	E51.351125
Wiring diagram electronic control + flow control	E51.351127
Wiring diagram electronic control, with flow control + dosage pump + overfill prevention amplifier	E51.351691
Sealing Arrangement for MultiFlow (AIII version) – Page 1 & 2	E52.350953
Disassembly of the Ex-housing	E51.351100
MultiFlow complete Explosion-proof housing (AI version)	E61.350992
Wiring Diagram for MultiFlow (AI version)	E51.350958
Wiring diagram pneum. control switch + dosage pump	E51.351190
Wiring diagram electronic control + dosage pump + overfill prevention amplifier	E51.351189
Wiring diagram electronic control + flow control	E51.351126
Wiring diagram electronic control with flow control + dosage pump + overfill prevention amplifier	E51.351692
Wiring diagram RS232 – Interface (AI version) – Page 1 & 2	E52.351015
EMIS and FlowComputer Basic Component Layout (Variant 3)	E61.351763
Basic Wiring Diagram EMIS and FlowComputer (Variant 3)	E61.351771
EMIS and FlowComputer Basic Component Layout (Variant 4)	E61.352218
Basic Wiring Diagram EMIS and FlowComputer (Variant 4)	E61.352217
Emergency power supply MF-EPS	E51.352078
Emergency power supply for the flow computer MultiFlow of a MID system	E51.352088
Sealing Arrangement for MultiFlow AI - Page 1 & 2	E52.350952
Sensor, pre approval Connection Thread G3/4	E51.350931
Pneumatic circuit diagram for delivery	E51.250828
Pneumatic circuit diagram Meter package with tank truck computer (TMU)	E51.250842
Pneumatic circuit diagram, Meter package with tank truck computer (TMU + AS)	E51.250857
Block diagram Overfill prevention amplifier type ASE-D-MF	E51.351143
Solenoid valves Connection diagrams & Order codes	E51.351740
SPD-Namursensor-Interface complete MSSPD-N	E51.351706
EPE2 connection to residue discharge (with MultiFlow)	E61.351994
MultiFlow Namursensor-Interface complete (MFSI)	E61.352182
Wiring diagram Namursensor-Interface (MFSI)	E51.352198
MultiFlow - I/O-Interface complete (MFIO2)	E51.352180
Wiring diagram I/O-Interface (MFIO2)	E51.352197
Certificates	
W & M seal form (blank)	annex
W & M seal form (blank) NEW	annex
Further authorization documents	
EC - Declaration of Conformity	

Relation of Functions to Drawing Numbers**AI version**

Function	Standard Plan	Additional Plan for Dosage Pump	Additional Plan for Level Control (ASE-x-MF)
Standard control	E51.350 958	E51.351 190	not planned
Fully electronic hose selection	E51.351 189	E51.351 189	E51.351 190
Fully electronic hose selection with flow control	E51.351 126	not planned	E51.351 190
Fully electronic hose selection with flow control & additive pump	E51.351 692	E51.351 692	E51.351 692

All version

Function	Standard Plan	Additional Plan for Dosage Pump	Additional Plan for Level Control (ASE-x-MF)
Standard control	E51.350 956	E51.351 017	not planned
Flow control	E51.351 052	E51.351 052	E51.351 052
Fully electronic hose selection	E51.351 125	E51.351 125	E51.351 125
Fully electronic hose selection with flow control	E51.351 127	not planned	E51.351 127
Fully electronic hose selection with flow control & additive pump	E51.351 691	E51.351 691	E51.351 691

Appendix B. Parameter summary

Display Configuration / Device Settings

No.	Name	Seal	K ¹	Factory Setting	Meaning
1	Display Config.				
1.1	Contrast	D	x		Display contrast setting
1.2	Date and Time	M/ Cal	0/x		Sets internal clock IMPORTANT: Date is subject to W & M restrictions!
1.3	User's Language	D	x		Display language for menus, alarms and reports
1.4	Customer's Lang.	D	x		Display language for deliveries and receipts

No.	Name	Seal	K ¹	Factory Setting	Meaning
2	Grand Totals	D	0/x	–	Display of grand totals Long-term and shift counters: <ul style="list-style-type: none"> Sum of uncompensated volume in liters (V_0) Sum of compensated volume in liters (V_T) Sum of masses in kg Sum of measured additive in liters NOTE: The day / shift counter can be reset with function key F1.

No.	Name	Seal	K ¹	Factory Setting	Meaning
3	Parameter List				
3.1.1	Device Number	Cal.	1	-	This parameter should be assigned the device ID (name-plate, see housing of operating device).
3.1.2	Meter Designation	Cal.	1	-	This parameter is used for identifying the measuring system. The designation is printed on all delivery notes and reports. Recommendation: Use the serial number of the measuring chamber (name-plate).
3.1.3	Seal Password	Cal.	1	123456	Password protection for electronic W & M seal.

Categories Of Parameters

K	Priority	Meaning
0	Cal., EEPROM	Highest security level; device settings which are <i>not</i> saved on the parameter chip
1	Cal.	High security level due to additional checksum; parameter transfer <i>from</i> the chip card only possible when <i>seal is broken</i> !
2	Master	High security level due to additional checksum; parameter transfer <i>from</i> the chip card only possible when <i>seal is broken</i> !
3	Master	Medium security level
x	Driver	Lowest security level; parameters which are <i>not</i> saved on the chip card

Operating Options

No.	Name	Seal	K	Factory Setting	Meaning
3.1.4	Operating Options		3		
3.1.4.1	Operating Mode	M	3	0 (Standard)	Selection of operating mode: 1 Standard, support of single and multiple metering systems 2 TMC mode, single and multiple metering systems in conjunction with a TMC 3 OBC mode, single and multiple metering systems in conjunction with an OBC 4 Like TMC mode, manual operation is disabled (remote mode) 5 Like OBC mode, manual operation is disabled (remote mode)
3.1.4.2	Save display	M	3	15	The discharged volume is saved in the display for the selected time in minutes. Thereafter, the ready screen is displayed again.

3.1.4.3	Currency Options		3		
3.1.4.3.1	Applicable Currency	M	3	0 (Currency A)	Selection of applicable currency (A or B). All preset prices, billing and driver input data are computed in this currency. Reference to the second currency can only be made additionally at the end of the receipt/bill (see EURO).
3.1.4.3.2	Exchange Rate	M	3	1.92573	Exchange rate between currencies A+B
3.1.4.3.3	Curr. Symbol Position	M	3	0 (after)	Determines the position of the currency symbol in printouts, i.e. before or after the amount
3.1.4.3.4	Currency Symbol A	M	3	£	Symbol used for currency A
3.1.4.3.5	Curr. Resolution A	M	3	2	Number of post-decimal places for curr. A
3.1.4.3.6	Currency Symbol B	M	3	EUR	Symbol used for currency B
3.1.4.3.7	Curr. Resolution B	M	3	2	Number of post-decimal places for curr. B
3.1.4.3.8	Resolution product price	M	3	5	Number of post-decimal places for product prices

3.1.4.4	Pre-set				
3.1.4.4.1	Standard pre-set	D	x	Country specific	Standard delivery quantity. Displayed in the delivery screen as standard value (pre-set)
3.1.4.4.2	Pre-set type	D	x	0 (comp)	Standard delivery quantity is compensated (0) or uncompensated (1)

3.1.4.5	Queries				
3.1.4.5.1	Driver ID Query	M	3	0 (no)	Activates the automatic driver logon (password query) after switch-on.
3.1.4.5.2	Language Query	M	3	0 (no)	Activates the automatic query for the customer's language before discharge.
3.1.4.5.3	Customer ID Query	M	3	0 (no)	Activates the customer's ID query for deliveries.
3.1.4.5.4	Customer Type Query	M	3	1 (yes)	Activates the customer type query (business or private) which determines whether prices are net or gross. When deactivated, the value of parameter 3.1.4.0.1 is considered automatically.
3.1.4.5.5	Other Products	M	3	1 (yes)	Activates the option to add several products to a delivery (e.g. bulk goods). When deactivated, only one product can be delivered on one receipt.
3.1.4.5.6	Payment Mode	M	3	0 (no)	Activates the payment mode query after printing of invoices.
3.1.4.5.7	Receipt copy	M	3	0 (no)	

3.1.4.5.7.1	Copy query	M	3	0 (no)	Activates request for an additional copy of the receipt immediately after printing the original.
3.1.4.5.7.2	Number of Copies	M	3	0	Standard-setting for the number of copies to be printed after the printing of the original parameters in conjunction with 3.1.4.5.7.1 . 0 After each print of a copy, the query shows up again. 1..10 After printing of the original, the number of copies to be printed afterwards can be set (only once).

3.1.4.5.8	Office transfer				
3.1.4.5.8.1	End data transfer	M	3	1 (yes)	After completion of the delivery, activates the status screen which is displayed during the external data transfer from the EMIS to the office interface (e.g. FTP server).
3.1.4.5.8.2	OBC connection	M	3	2 (yes)	Activates wait screen during synchronization of MultiFlow and EMIS before start of delivery. 1 inactive 2 always 3 before delivery 4 after delivery
3.1.4.5.9	Compartment number	M	3	0 (no)	Activates request for the compartment number in the delivery pre-set.
3.1.4.5.0	Order number				
3.1.4.5.0.1	Order number	M	3	0 (no)	Activates request for order number in the delivery pre-set.
3.1.4.5.0.2	Standard pre-set	D/M	3		Standard text for order number
3.1.4.5.0.3	Enhanced protection parameter	M	3	0 (no)	Modification of the parameter 3.1.4.5.0.2 . Only after entering the master password.

3.1.4.6	No-load Measurement				(version 5.02 and higher)
3.1.4.6.1	Activate Measurement	M	3	0 (nein)	Activation of the no-load measurement
3.1.4.6.2	Minimum amount	M	3	10	Minimum amount of product which needs to be measured in the amount of time specified in 3.1.4.6.3 so that the delivery is found valid and continued. (1...50 L)
3.1.4.6.3	Active Period	M	3	30	Period in which the minimum quantity of product (3.1.4.6.2) must be measured during idling, so that the measurement is found valid and continued. (1...300 s)
3.1.4.6.4	Timeout	M	3	60	Period after which the product flow is terminated automatically without any further active idle measurement. (1...180 s)
3.1.4.6.5	Info	M	3	0 (no)	Status output in the History window. Helpful during the configuration phase of the no-load measurement.
3.1.4.7	---				
3.1.4.8	Add Surcharge	M	3	0 (no)	Activates special surcharge on the receipt.
3.1.4.9	Default Surcharge	M	3	31	Product code for special surcharge (e.g. transport duty). Default can be changed by the user on site.

3.1.4.0	Billing				
3.1.4.0.1	Billing	M	3	1 (gross)	Activates/deactivates the billing option (c.f. also 3.1.4.5.4): 0: no bill 1: bill based on gross prices (with VAT incl.) 2: bill based on net prices (without VAT)
3.1.4.0.2	Second tax rate	M	3		Only for the English version of the program. Parameter not active in German version.

3.1.4.0.3	Volume limit	M	3		Only for the English version of the program. Parameter not active in German version.
3.1.4.0.4	OBC summary	M	3	0 (no)	Summary of all orders transmitted by the OBC on one receipt

W & M Restrictions

No.	Name	Seal	K	Factory Settings	Meaning
3.1.5	W & M Restriction				
3.1.5.1	Parameter List 1				
3.1.5.1.1	Volume Resolution	Cal.	1	0	Volume division: Number of post-decimal places on volume display.
3.1.5.1.2	No. of Discharges	Cal.	1	1	Maximum number of discharges per receipt.
3.1.5.1.3	Minimum Preset	Cal.	1	200 (liters)	Minimum default volume for discharge (in increments of 200 liters)
3.1.5.1.4	Minimum Layout	Cal.	1	2,3,(11:12),25	Minimum requirement from W&M for bill / delivery receipt
3.1.5.1.5	Price Correction	Cal.	1	1 (yes)	Determines whether the retrospective modification of prices is permitted with measured products.
3.1.5.1.6	Decimal Separator	Cal.	1	1 (',')	Separator for decimal places: '!' or ','
3.1.5.1.7	Show Additive	Cal.	1	0 (no)	IMPORTANT: Parameter not currently active. See parameter 3.3.3.3.
3.1.5.1.8	Flushing volume				
3.1.5.1.8.1	Flushing product	Master	3	Product index	Definition of product used to flush the measuring system.
3.1.5.1.8.2	Flushing volume	Master	3	0 (liters)	Specification of the quantity of product used to flush the measuring system
3.1.5.1.8.3	Min. flushing volume	Cal.	1	0 (liters)	Minimum pre-set quantity after a product change (due to product contamination) in liters. Specify according to calibration regulations.
3.1.5.1.8.4	OBC flushing monitor	Master	3	0 (no)	Monitors flushing of measuring system when processing deliveries which have been transferred via OBC. 0: No 1: Yes 2: Automatic
3.1.5.1.9	Force Delivery Stop	Cal.	1	0 (inactive)	Determines the time after which a delivery is automatically terminated when no flow is recognized. Function inactive 1-99 Time limit in minutes
3.1.5.1.0	Hide delivery	Cal.	1	0 (inactive)	When active, actual delivery quantity is not displayed during delivery.
3.1.5.2	Parameter List 2				
3.1.5.2.1	Access density	Calibration supervisor Driver	1	0	Defines parameter protection for product density 0: Seal 1: Supervisor 2: Driver

CAN-Bus (global)

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6	Global CAN-Bus				Changes on CAN Bus parameters take effect only after restart.
3.1.6.1	Global Node No.	M	2	0	Node number (address) of the MultiFlow when several devices are linked to one external CAN Bus. 0: No CAN communication 1: Node no. of the first MultiFlow. Controls the printer (default mode). 2-31: Node no. of the subordinate devices
3.1.6.2	CAN-Termination	M	2	1 (yes)	Controls the electronic termination of the CAN Bus. Must be activated for the devices furthest apart at the CAN-bus, e.g. TMC and second MultiFlow.
3.1.6.3	OBC				
3.1.6.3.1	OBC node	M	2	0	Node number of the TMC or on-board computer, if this has been activated under 3.1.4.1 "Operating mode".
3.1.6.3.2	Disable AutoTX	M	2	0 (no)	Disables delivery data transfer after a delivery. Transfer only possible via PRINT menu.
3.1.6.3.3	Enhanced Document Layout	M	2	0 (no)	Activation of the output of bill of delivery on the delivery receipt at orders received from the OBC.

Remote operation

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.4	Remote operation				
3.1.6.4.1	Use remote operation	M	2	0 (no)	Activation of the remote operation option
3.1.6.4.2	Remote operation node	M	2	0	Node number of the base station of the remote operation, if this has been activated.

Overfill prevention

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.5	Overfill prevention at the service station				
3.1.6.5.1	Transmission interval	M	2	18 (sec/10)	Repeat rate of the overfill prevention signal. If the signal fails the discharge is terminated with an OP error.
3.1.6.5.2	OP node	M	2	0	Node number of the base station of the overfill prevention if this has been activated under 3.1.8.8.

Dead man's switch

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.6	Dead man's switch				
3.1.6.6.1	Use dead man	M	2	0 (no)	Activation of the optional driver attention monitoring device.
3.1.6.6.2	Transmission interval	M	2	18 (sec/10)	Repeat rate of the attention signal. If the signal fails the discharge is terminated with a dead man error.
3.1.6.6.3	Dead man node	M	2	0	Node number of the base station of the monitoring device, if the latter has been activated.

EPE2

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.8	EPE2				(version 5.00 and higher)
3.1.6.8.1	Use of EPE2	M	2	0 (no)	Activation of EPE2 required for optional residue discharge
3.1.6.8.2	EPE2 node	M	2	5	Node number of EPE2 when activated
3.1.6.8.3	EPE2 interval	M	2	600ms	EPE2 request interval. Used to trigger EPE2 inactivity monitor.
3.1.6.8.4	Invert	M	2	0 (No)	Invert the input conditions sent from the EPE2 (including when an EPE2-A1 is used). Short-circuit and interruption are not affected by this.

Sensor interface

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9	Sensor interface				
3.1.6.9.1	Use SI	S/M	2	0 (no)	Activation of the optional sensor module
3.1.6.9.2	SI node	S/M	2	0	Node number of sensor module when activated.
3.1.6.9.3	Compartment number	S/M	2	1	Number of compartments to monitor. (1 .. 20)
3.1.6.9.4	Request interval		2	60s	Average request interval without connecting external power supply. (0 .. 21600s)
3.1.6.9.5	Transmission delay	S/M	2	50ms	Interface-end telegram delay on CAN bus. (0 .. 255ms)
3.1.6.9.6	Trigger interval	S/M	2	5s	Interval before watchdog is triggered (inactivity detection). (0 .. 60)

Sensors

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9.7	Sensors				
3.1.6.9.7.1	Dome cover	S/M			
3.1.6.9.7.1.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.1.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.1.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.2	API coupling	S/M			
3.1.6.9.7.2.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.2.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.2.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.2.4	Delay time	M	2	0s	Delay time for detecting a status change during delivery
3.1.6.9.7.3	Foot valve	S/M			
3.1.6.9.7.3.1	Start sensor pos.	M	2	0	Position of the first sensor

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.9.7.3.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.3.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.4	In-line valve	S/M			
3.1.6.9.7.4.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.4.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.4.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.5	Cabinet door left	S/M			
3.1.6.9.7.5.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.5.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.5.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.6	Cabinet door right	S/M			
3.1.6.9.7.6.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.6.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.6.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.7.7	Handbrake	S/M			
3.1.6.9.7.7.1	Start sensor pos.	M	2	0	Position of the first sensor
3.1.6.9.7.7.2	Sensor type	M	2	1 - Digital NC contact	Type of sensor 1 – Digital NC contact 2 – Digital NO contact 3 – Namur NC contact 4 – Namur NO contact
3.1.6.9.7.7.3	Alarm event	M	2	0 (no)	Additional alarm message at change of status. Must be acknowledged by the user.
3.1.6.9.8	Ext. parameter protection	S/M	2	0 (no)	Activates extended parameter protection. When active, sensor interface parameters can be changed only when the electronic seal is broken.

IO interface

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0	IO interface				
3.1.6.0.1	Use IO	M	2	0 (no)	Activation of the optional IO expansion
3.1.6.0.2	IO node	M	2	0	Node number of the IO expansion, if the latter has been activated.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0.3	Transmission delay	M	2	50ms	Interface-end telegram delay on CAN bus. (0 .. 250ms)
3.1.6.0.4	Outputs				
3.1.6.0.4.1	Output1				
3.1.6.0.4.1.1	Link				
3.1.6.0.4.1.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.1.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.1.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.1.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.1.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined.
3.1.6.0.4.1.2	Additional hose path				
3.1.6.0.4.1.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.1.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.2	Output2				
3.1.6.0.4.2.1	Link				
3.1.6.0.4.2.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.2.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.2.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.2.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.2.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.2.2	Additional hose path				
3.1.6.0.4.2.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.2.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.3	Output3				
3.1.6.0.4.3.1	Link				
3.1.6.0.4.3.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.3.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.3.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.3.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.3.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.3.2	Additional hose path				
3.1.6.0.4.3.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.3.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.4	Output4				
3.1.6.0.4.4.1	Link				
3.1.6.0.4.4.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.4.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.4.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.4.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0.4.4.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.4.2	Additional hose path				
3.1.6.0.4.4.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.4.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.5	Output5				
3.1.6.0.4.5.1	Link				
3.1.6.0.4.5.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.5.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.5.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.5.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.5.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.5.2	Additional hose path				
3.1.6.0.4.5.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.5.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.6	Output6				
3.1.6.0.4.6.1	Link				
3.1.6.0.4.6.1.1	Output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.6.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.6.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.6.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.6.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.6.2	Additional hose path				
3.1.6.0.4.6.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.6.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.7	Output7				
3.1.6.0.4.7.1	Link				
3.1.6.0.4.7.1.1	output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.7.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.7.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)
3.1.6.0.4.7.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.7.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.7.2	Additional hose path				
3.1.6.0.4.7.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.7.2.2	Designation	M	2		Designation of the additional hose path
3.1.6.0.4.8	Output8				
3.1.6.0.4.8.1	Link				
3.1.6.0.4.8.1.1	output	M	2	0	Local reference output to be linked 1 .. 7
3.1.6.0.4.8.1.2	Input	M	2	0	Reference input to be linked 1 .. 4 (local), 5 .. 6 (external)
3.1.6.0.4.8.1.3	Delay time	M	2	0 * 0.1s	Minimum time between detected change of the reference in/output and switching of the allocated ext. output. (0 .. 100 * 0.1s)

No.	Name	Seal	K	Factory Setting	Meaning
3.1.6.0.4.8.1.4	Inversion	M	2	0 (no)	Status of the allocated ext. output should assume inverted status of the reference in/output.
3.1.6.0.4.8.1.5	Product dependency	M	2	0 (no)	Up to 5 project dependencies can be defined. (0, 10 .. 39)
3.1.6.0.4.8.2	Additional hose path				
3.1.6.0.4.8.2.1	Use	M	2	0 (no)	Use output to control an additional hose path.
3.1.6.0.4.8.2.2	Designation	M	2		Designation of the additional hose path

CAN-Bus (lokal)

No.	Name	Seal	K	Factory Setting	Meaning
3.1.7	Local CAN Bus				ATTENTION: The settings for a local (internal) CAN Bus cannot be altered until further notice.
3.1.7.1	Internal Node No.	M	2	0	Node number of the main board on the internal CAN Bus.
3.1.7.2	Display No. 1	M	2	1	Node number of the first display on the internal CAN Bus.
3.1.7.3	Display No. 2	M	2	0 (inactive)	Node number of the second display on the internal CAN Bus.

Valve Control

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8	Valve control				
3.1.8.1	Path Selection	Cal.		Basic control	Defines the structure of the measuring system used: 1. Basic control: Basic version with manual operation of a control block and product release. 2. High/Low Flow: as above, but with reduction of the flow at the start and end of the discharge. 3. Fully electronic: Control switch replaced by electronical valve controller. (not supported in current version) 4. Expanded electronical control: as described in 3., but combined with flow control (however, no additive dosing possible). 5. With blow down (GB): special control for GB, with flow control, additive pump, blow down of the dry hose after the discharge and product transfer / self loading. 6. Expanded electronical control: as described in 3., with flow control & additive dosing (no unmetered discharge)
3.1.8.2	Turn-on Delay	M	2	3 (sec)	Delay on activating the control valve before the release valve.
3.1.8.3	Turn-off Delay	M	2	3 (sec)	Delay on closing the release valve before the control valve.

Flow Control

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.4	Flow Control				
3.1.8.4.1	High Flow Rate ON	M	2	5.0 (liter)	Threshold for switchover from a reduced to a higher flow rate: Positive value: Amount in liters Negative values: Flow rate in liters/min.
3.1.8.4.2	High Flow Rate OFF	M	2	20.0 (liter)	Remaining volume at which the switchover to reduced flow rate takes place.
3.1.8.4.3	Wet Hose OFF	M	2	0.5 (liter)	Remaining volume at which the flow is stopped. Used for all hoses, except for Dry Hose (G) or (P)
3.1.8.4.4	Dry Hose (G) OFF	M	2	0.5 (liter)	Remaining volume at which the flow is stopped. Only applicable for Dry Hose and Gravity discharge.
3.1.8.4.5	Dry Hose (P) OFF	M	2	1.5 (liter)	Remaining volume at which the flow is stopped. Only applicable for Dry Hose and pumped discharge.
3.1.8.4.6	Enable Adjustment	M	2	1 (yes)	Enables the automatic adjustment of parameters 3.1.8.4.3 ... 3.1.8.4.5
3.1.8.4.7	---				
3.1.8.4.8	Start delay	M	3	0 m(sec.)	Delay time between hose selection and delivery start. (0 .. 10s).

Draining

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.5	Draining				
3.1.8.5.1	Drain control	M	2	0 (no)	(up to version 5.00) Activates a reminder concerning residue removal in the event of product change.
3.1.8.5.2	Receipt draining	M	2	0 (no)	(up to version 5.00) Parameter currently not in use. In a future program version will activate printout of a receipt after residue removal.
3.1.8.5.1	Residue removal control	M	2	1	(version 5.00 and higher) 1 : Off 2: Stand-alone Activates a reminder concerning residue removal in the event of product change. 3: EPE2-manual As described under 2; however, the wet leg sensor connected to the EPE2 monitors the residue removal. No restart of MultiFlow required after residue removal. 4: EPE2-AIII As described under 3; however, the "Autom. residue removal" menu item (menu 8) includes the option to control a pump for the measuring system residue removal via the EPE2 output. 5: EPE2-AI As described under 4; but due to the system, instead of a pump, a valve is connected to the EPE2 which gives the additional option of a product change between AI and AIII products.

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.5.2	Residue removal timeout	M	2	0 (no)	(version 5.00 and higher) Timeout for the autom. draining of the measuring system with the aid of the EPE2 in "EPE2 automatic" mode. Residue removal stops automatically after this period of time.
3.1.8.5.3	Residue removal receipt	M	2	0 (no)	(version 5.00 and higher) Parameter currently not in use. In a future program version will activate printout of a receipt after residue removal.
3.1.8.5.4	With product change	M	2	0 (no)	Residue removal query appears after each product change, unless residue removal had previously been detected.
3.1.8.6	---				No longer applicable from version 2.1 and higher; see 3.1.8.4.3
3.1.8.7	Hose Set	Cal.	1	UVLB	Defines the hose paths that are used in the measuring system for later selection. B Bypass D (L) Dry hose G (S) Dry hose with Gravity discharge P Pumped dry hose discharge U Unmetered W (V) Wet hose Note: Each abbreviation may be used only twice at the most.

Overfill prevention

No.	Name	Seal	K	Factory Setting	Meaning
3.1.8.8	Overfill prevention				
3.1.8.8.1	Overfill prevention	M	0	No	The control element function is transferred from the overfill prevention to the MultiFlow. No No monitoring, MultiFlow is not an element of the delivery safety system. Frequency Input: A level sensor with frequency output is used. Switch Input: A level sensor with switch output is used. RF overfill prevention: OP signal is transmitted via RF and base station to the MultiFlow
3.1.8.8.2	Info	D	2	(0) no	Issue a message on change of status of a cable-based overfill prevention.
3.1.8.9	Valve Compilation	M	2	0	Select Valve Compilation (see also 8.3.1.8.5) 0 General configuration 1 GVLx-xM, dry hose operation is modified
3.1.8.0	Blow Down	Cal.	1	8 (sec)	Applicable only for UK version: Blow down of dry hose (duration)

Receipt ID

No.	Name	Seal	K	Factory Setting	Meaning
3.1.9	Receipt number				
3.1.9.1	Separate receipt number	Cal.	0	0 (no)	0: Joint numbering cycle for delivery note and invoice numbers 1: Separate delivery note and invoice numbers
3.1.9.2	Receipt number (*)	Cal.	0	0	Number to be used for next receipt
3.1.9.3	Invoice no. (*)	Cal.	0	0	Number to be used for next invoice
3.1.9.4	Delivery note no. (*)	Cal.	0	0	Number to be used for next delivery note

(*):- Depending on the parameter setting 3.1.9.1 either parameter 3.1.9.2 or parameters 3.1.9.3 and 3.1.9.4 are shown.

Printer Settings

No.	Name	Seal	K	Factory Setting	Meaning
3.2	Printer	M			
3.2.1	Printer Selection	1:M 2:M 3:M 4:M 5:M 6:M 7:M 8: M 9:Cal.	3	7 (TM-U295)	Printer selection 1: Dr-570 2: DR-290/295 (FDW) 3: DR-298 (FDW) 4: FX (Tally) 5: ASCII 6: TM-U220 7: TM-U295 8: BLASTER ADV. (only MID-Version) 9: No printer (this function is not available in some countries)
3.2.2	Interface Type	M	3	0 (RS232)	Switch between RS232 and RS485.
3.2.3	Transfer Rate	M	3	0 (9600 baud)	Data transmission speed.
3.2.4	Parity Check	M	3	0 (none)	Activation / deactivation of the parity check. 0: No parity 1: Even Parity 2: Odd parity
3.2.5	Lines per Page	M	3	57	Number of lines on a page.
3.2.6	FDW protocol				
3.2.6.1	Protocol	Cal.	1	1 (yes)	Activation / deactivation of the FDW protocol for data subject to W & M restrictions.
3.2.6.2	FDW timeout	M	3	5 (sec)	Max. waiting period for FDW status interrogation.
3.2.6.3	Resends	M	3	2	Number of repeated transmissions when erroneous transmissions occur.
3.2.6.4	Max. error count	Cal.	1	99	Sets the number of erroneous printouts (unsuccessful attempts to print a receipt correctly) which are allowed before the device blocks any further discharges. NOTE: Function currently not supported
3.2.7	Paper feed	M	3	1 (autom.)	Activates the automatic paper feed when using the DR-295.
3.2.8	Reverse ejection	M	3	0 (no)	Enables the reversal of the paper ejection direction for DR-295- and DR-298 printers. 2 no, ejection opposite to printing direction (i.e. "forwards") 1 yes, ejection in the printing direction (i.e. "backwards")
3.2.9	Data bits	M	3	1 (8bit)	Number of data bits for data transfer 0: 7bits 1: 8bits

Pulse inputs

No.	Name	Seal	K	Factory Setting	Meaning
3.3.1	Pulse counter				
3.3.1.1	Pulse Rating	Cal.	1	1	Number of pulses per liter (see preliminary certificate and measuring system name-plate).
3.3.1.2	Max. Return Volume	Cal.	1	8 (liter)	Permissible return volume up to which no error is displayed, in liters.
3.3.1.3	Max. Error Pulses	Cal.	1	2	No of permissible error pulses. PTB recommendation: The set value should correspond to twice the pulse rating (i.e. in this case 2 liters)
3.3.1.4	Sensor Type	Cal	1	2 (PNP)	Selection of the pulse transmitter type. 1: NPN 2: PNP (default) 3: THS (Sening GMVT 704/805/1004) IMPORTANT: The type coding is offset by one place from the program version 1.01.!
3.3.1.5	Min. Flow Rate	Cal.	1	20 (L/Min.)	Minimum flow rate during discharge. Flow rates below this limit will switch off pulse error detection and the discharge will be interrupted after 30 seconds. 0: A value of 0 liters/minute will switch off this function.
3.3.1.6	Direction of rotation	Cal.	1	0 (default)	Direction of rotation of the measurement system: 0: default 1: reversal of the direction of rotation

Temperature Sensor

No.	Name	Seal	K	Factory Setting	Meaning
3.3.2	Temperature sensor				
3.3.2.1	Temp. Offset	Cal.	1	Preliminary certificate	Figure for temperature offset according to W&M certificate.
0	Offset 0°C	-	0	Device size	Setting for temperature offset. IMPORTANT: The parameter is set during the preliminary test and cannot be changed.
0	Offset 100°C	-	0	Device size	Setting for temperature offset. IMPORTANT: The parameter is set during the preliminary test and cannot be changed.
3.3.2.2	Disable sensor	Cal.	1	0 (No)	(De)activates the MultiFlow temperature measurement. IMPORTANT: With an inactive sensor no compensation and no mass computation can be carried out! IMPORTANT: If no sensor is connected, the temperature inputs must be fitted with a jumper.

Additive Pump

(also called “Dosage Pump” or “Injection Pump”)

No.	Name	Seal	K	Factory Setting	Meaning
3.3.3	Additive Pump				
3.3.3.1	Piston Capacity	Cal.	1	50 (mℓ)	Additive volume per stroke in mℓ .
3.3.3.2	Meter Factor	Cal.	1	1.0	Correction factor of additive pump. IMPORTANT: Follow chapter 7.2 in setting this parameter.
3.3.3.3	Pump Position	Cal.	1	1	Injection point of additive pump: 0: No function 1: Before measuring system 2: After measuring system (subject to W & M inspection!)
3.3.3.4	Hose Volume	Cal.	1	50 (liter)	Volume of measuring system for wet-hose discharge (measuring system + hose drum) in liters.
3.3.3.5	Ext. Prod. Sensor	M	2	0 (inactive)	Activates monitoring of the filling level on the external storage tank. IMPORTANT: The function is currently not supported.
3.3.3.6	Pump Cycle Time	M	2	6000 (msec)	Maximum time for a pump cycle in msec.
3.3.3.7	Start Interval	Cal.	1	80 (msec)	Minimum dwell time of the piston in the initial position in msec.
3.3.3.8	End Interval	Cal.	1	80 (msec)	Minimum dwell time of the piston in the end position in msec.

Form Description

No.	Name	Seal	K	Factory setting	Meaning
3.4	Form description				
3.4.1	Spacing	M	3	1 (characters)	Entry of spacing for the printout in mm or in characters. Characters is the standard.
3.4.2	Columns Offset	M	3	0	Number of columns before the printout in mm or in characters. Characters is standard.
3.4.3	Lines Offset	M	3	0	Number of lines before the printout in mm or in characters. Characters is standard.
3.4.4	ReceiptLayout	M	2	-	Delivery receipt definition, form dialogue.
3.4.5	Print Form	M			Test printout of the delivery receipt.
3.4.6	Form Elements List	M			Printout of defined elements for describing the delivery receipt.

Product Definition

No.	Name	Seal	K	Factory Setting	Meaning
3.5	Product Definition				
3.5.1	Product Page 1				Product registers 1.1 - 1.0
3.5.2	Product Page 2				Product registers 2.1 - 2.0
3.5.3	Product Page 3				Product registers 3.1 - 3.0

No.	Name	Seal	K	Factory Setting	Meaning
3.5.nn.7.3 ⁶	Product group	Cal.	1		Determination of the compensation algorithm in dependence of the product group: 1 Packed Goods 2 Crude Oil (API-Table 54A) 3 Refined Oil (API-Table 54B) 4 Special Product (API Table 54X) for liquid gas & bitumen 5 Lube Oil (API-Table 54D) 6 Direct-Linear (Mixed Products) for e.g. E5, E10 ...

Product Registers (35nn..)

The placeholder 'nn' in the product register corresponds to the product register number where 'nn' varies from 11 to 30. The product register number is extended by the parameter number to give unambiguous identification of a parameter in a product register.

Example: Mean density on the first product page in the third product register. The placeholder **nn** is in this case substituted by page **1** and register **3** (nn = 13).

Product register		Parameter
Page	Register	
35	1	3
		73

No.	Name	Seal	K	Factory Setting	Meaning
3.5.n	Product pages				
3.5.nn.1	Product name	Cal.	1		Product name
3.5.nn.2	Product type	M/ Cal.	1/3		Product category (1: Liquid product, 2: Additive, 3: Packed products) IMPORTANT: Liquid products can only be activated by breaking the W & M seal!
3.5.nn.3	W&M code	Cal.	1		W&M article code
3.5.nn.4	Unit	Cal.	1		Selection list
3.5.nn.5	Use add. pump				
3.5.nn.5.1	Use add. pump	M	2	0 (no)	This parameter activates the additive dispensing for the selected product register.
3.5.nn.5.2	Additive number	M	2	0	Reference to the register number of the additive to be used. IMPORTANT: The parameter is only active when parameter 3.5.n.n.5.1 is set to 1 (yes) and 3.3.3.3 is not set to zero (inoperable).
3.5.nn.5.3	Mixing ratio	M	2	2000	Mixing ratio for the additive. IMPORTANT: The parameter is only active for products of type 2 (additive).
3.5.nn.6	Default price				
3.5.nn.6.1	Default price	M	3		Standard price for the product.

⁶ Printout of Section 12 ElexV see Appendix

No.	Name	Seal	K	Factory Setting	Meaning
3.5.n.n.6.1.1	Scale price 1	M	3	0	Price setting for delivery quantity from 0 upwards.
3.5.n.n.6.1.2	Scale price 2	M	3	0	Price setting for user defined delivery quantity.
3.5.n.n.6.1.3	Scale price 3	M	3	0	Price setting for user defined delivery quantity.
3.5.n.n.6.1.4	Scale price 4	M	3	0	Price setting for user defined delivery quantity.
3.5.n.n.6.1.5	Scale price 5	M	3	0	Price setting for user defined delivery quantity.
3.5.nn.6.2	Price factor	M	3		The standard price applies to 1, 10, 100 units, etc. Price factor "0" defines a fixed price which is not dependent on quantity (packed goods only).
3.5.nn.6.3	Tax rate	M	3		Entry of rate for value added tax (percent).
3.5.nn.7	Temp. compensation				
3.5.nn.7.1	Compensation	Cal.	1	1 (yes)	Activation of compensation: 1. No: Compensation deactivated. Printout carried out with VT. 2: Yes (receipt: V0&VT): VT and V15 printout carried out using form module 12. (Use for products with voluntary compensation.) 3: Yes (receipt: V0): V0 printout carried out using form module 12. (Use for products with statutory compensation.)
3.5.nn.7.2	Comp. temperature	Cal.	1	15°C	Selection of compensation temperature
3.5.nn.7.3	Product group	Cal.	1		Determination of the compensation algorithm in dependence of the product group: 1 Packed Goods 2 Crude Oil (API-Table 54A) 3 Refined Oil (API-Table 54B) 4 Special Product (API Table 54X) for liquid gas & bitumen 5 Lube Oil (API-Table 54D) 6 Direct-Linear (Mixed Products) for e.g. E5, E10 ...
3.5.nn.7.4	Mean density	Cal.	1		Physical constant specified by W&M.
3.5.nn.7.5	Meter Factors				
3.5.nn.7.5.1	Meter Factor 1	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.2	Meter Factor 2	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.3	Meter Factor 3	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.4	Meter Factor 4	Cal.	1		See "Fehler! Verweisquelle konnte nicht gefunden werden."
3.5.nn.7.5.5	Flow Rate 1	Cal.	1		Upper limit of validity range for Meter Factor 1
3.5.nn.7.5.6	Flow Rate 2	Cal.	1		Upper limit of validity range for Meter Factor 2
3.5.nn.7.5.7	Flow Rate 3	Cal.	1		Upper limit of validity range for Meter Factor 3
3.5.nn.7.5.8	Flow Rate 4	Cal.	1		Upper limit of validity range for Meter Factor 4
3.5.nn.7.5.9	Copying from ...	Cal.	1		Copies the calibration data (see above) from a different product register.
3.5.n.n.7.6	Min. product temp.	Cal.	1	99	Autom. end of delivery in the event of temperature shortfall. Applicable range -20°C to 20°C. The value 99 deactivates this function.
3.5.nn.7.7	Change factor				Required for product group "6 Direct-Linear" to temperature volume compensation of mixed products (E5, E10 ...)
3.5.nn.7.7.1	Min. temperature	Cal.	1	-20	Min. temperature for temperature volume compensation -120 .. 120°C
3.5.nn.7.7.2	Max. temperature	Cal.	1	50	Max. temperature for temperature volume compensation -120 .. 120°C

No.	Name	Seal	K	Factory Setting	Meaning
3.5.nn.7.7.3	Change factor	Cal.	1	0	Density change factor to calculate according to "Method 1" in [1 / K] -1000.0 1000.0 ..., Minimum value: + /-1.0E-7
3.5.nn.8	Hose set	M	2	WP	Allowed hoses for this product, see parameter 3.1.8.7

Driver List

No.	Name	Seal	K	Factory Setting	Meaning
3.6	Driver list				
3.6.1	Driver 1	M			Driver Register 1 (entry of the driver's ID and name and of the master code)
3.6.2	Driver 2	M			Driver Register 2 (entry of the driver's ID and name and of the master code)
3.6.3	Driver 3	M			Driver Register 3 (entry of the driver's ID and name and of the master code)
3.6.3	Driver 4	M			Driver Register 4 (entry of the driver's ID and name and of the master code)
3.6.5	Driver 5	M			Driver Register 5, factory definition of master, can be changed.

Driver Register (36n..)

No.	Name	Seal	K	Factory Setting	Meaning
3.6.n.1	Driver ID	M	3		Personnel number of the driver
3.6.n.2	Driver Name	M	3		Name of the user, can be printed on receipts.
3.6.n.3	Master code	M	3		If not set to "0", then master code for increased access.

"36n" is the driver's register number, with "n" varying from 1 to 6. For unequivocal identification of a parameter the driver's register number is extended by the parameter number.

Example: Driver's name in the third driver register

Driver Register	Parameter
36 3	2

The following operators are defined in the factory settings:

Employee ID.	Password	Access Right
000001	- - -	Driver
999999	654321	Master

** Passwords are always 6-digit numbers.*

Electronic Seal

No.	Name	Seal	K	Factory Setting	Meaning
4.1	Electronic seal				
4.1.1	Display Seal	D			Display status of electronic W & M seal.
4.1.2	Print Seal	D			Print status of electronic W & M seal.
4.1.3	Break Seal	M/ Cal.			Breaks the electronic W & M seal to obtain access to sealed parameters. ATTENTION: This function is not available in some countries
4.1.4	Restore Seal	M/ Cal.			Saves modified W & M information. IMPORTANT: To be executed in the presence of a W & M inspector or service person only!

Calibration

No.	Name	Seal	K	Factory Setting	Meaning
4.2	Calibration	Cal.			Procedure for measuring the meter factors at various flow rates.

Diagnosis

No.	Name	Seal	K	Factory Setting	Meaning
4.3	Diagnosis				
4.3.1	In- / Outputs	M/Cal.			Tests the inputs and outputs. IMPORTANT: The setting of the outputs is subject to W & M restrictions!
4.3.2	Printer	M			Loop-back test for testing the printer line with a special printer connector.
4.3.3	Global CAN Bus	M			Display link status of all CAN Bus devices.
4.3.4	Remote control	M			Testing the radio remote control
4.3.5	---				
4.3.6	EPE2	M			(version 5.00 and higher) Testing the EPE2 functions
4.3.7	IO interface	M/Cal.			Testing the external inputs and outputs of the IO module (8 outputs, 2 inputs).
4.3.8	Sensor interface	M			Checking the statuses of the activated sensor inputs of the external sensor module.
4.3.9	TMC test				To test the TMC telegrams. N/A.

Initialize

No.	Name	Seal	K	Factory Setting	Meaning
4.4	Initialize	M/Cal.			Resets the device parameters (restores the factory settings).
4.4.1	Device Parameter	M/Cal.			(version 5.02 and higher) Resets the device parameters

No.	Name	Seal	K	Factory Setting	Meaning
4.4.2	Logbook	M/Cal.			(version 5.02 and higher) Resets the internal logbook

Chip Card

No.	Name	Seal	K	Factory Setting	Meaning
4.5	Chip card				
4.5.1	Write Parameters	M/Cal.			Loads all parameters and delivery receipt definition from the chip card.
4.5.2	Read Parameters	M/Cal.			Reads out all the parameters and the delivery definition.
4.5.3	Format Chip	Cal.			Erases all data from a chip card.

Program Update

No.	Name	Seal	K	Factory Setting	Meaning
4.6	Program update				(up to version 5.00)
4.6.1	Activated	M			Program update activated
4.6.2	Blocked	M			Program update barred
4.6	Program update				(up to version 5.00)
4.6.1	Program update	M			Enabling/disabling the download
4.6.2	Rem. download attempts	M			Displays the remaining download attempts
4.6.3	Update report	M			Printout of download logbook
4.6.4	Reset	Cal.			Resetting the download logbook

Checksums

No.	Name	Seal	K	Factory Setting	Meaning
4.7	Checksums	F			(version 5.00 and higher) Display of all checksums and version number

Sensor Monitor

No.	Name	Seal	K	Factory setting	Meaning
5	Logon	F			Entry of the driver code for a change of drivers (logon).
6	Load Monitor	M			Displays the actual load status and gives the option to set the warning level for "additive load undercut"
7	Flush measuring system	F			Start of the flushing process for the measuring system
8	Residue removal EPE2	F			Control of a residue discharge pump connected to the EPE2. For this purpose the "EPE2-AIII" or "EPE2-AI" mode must be activated (parameter 3.1.8.5.1).

Product Definition

The factory settings already include a number of predefined products. They are located in the product register under the position stated in the following table as **(No.)**.

No.	PTB-Code	Name	Unit	Density	Price	
					€	Factor
11	1	Heating Oil	ℓ	846	0,00	100
12	2	Diesel	ℓ	836	0,00	100
13	3	Super E5	ℓ	749	0,00	100
14	5	Super E10	ℓ	749	0,00	100
15	6	4-Star	ℓ	753	0,00	100
16	7	Kerosene	ℓ	807	0,00	100
17	8	Jet Fuel	ℓ	801	0,00	100
18	9	Bio Fuel Oil	ℓ	831	0,00	100
19	12	Heating Oil +	ℓ	846	0,00	100
21	-	Additive (1L)	pcs.	-	0,00	1
22	20	Additive (Pump)	ml	-	0,00	1000
31	-	Transport Duty	-	-	0,00	0
32	97	Propane	ℓ	509	0,00	100
33	98	Butane	ℓ	577	0,00	100
34	99	LPG	ℓ	537	0,00	100
35	0	E05	ℓ	739	0,00	100
36	0	E10	ℓ	741	0,00	100
38	0	E80	ℓ	781	0,00	100
39	0	E85	ℓ	785	0,00	100

Note: Programmed calculation for final cost: [1]

Printer Settings

No.	Name	Seal	K	Factory setting	Meaning
1	Short report	D			Short report over the selected reporting period. Selection possible according to time or receipt no.
2	Detailed report	D			Detailed overview over the selected reporting period. Selection possible according to time or receipt no.
3	Copy receipt	D			Reproduction of receipts according to selected receipt numbers
4	ZERO receipt	D			Receipt as proof that counter is at ZERO
5	Parameter list	D			
5.1	W & M settings	D			Only prints settings relevant to W&M requirements
5.2	All settings	D			Prints all settings.
5.3	Driver list	M			Output list of all registered drivers NOTE: The passwords for the master access are printed as well.
5.4	Form elements	D			Listing of defined form elements
5.5	Receipt layout	D			Test printout of defined receipt layout
6	Event report	M			Print extract from the log book according to selected time period
7	Office link	F			Save a trip report on the chip card

No.	Name	Seal	K	Factory setting	Meaning
7.1	Chip card	F			Saving a trip report to a chip card.
7.2	Office transfer	F			
7.2.1	Delivery data	F			Only available in combination with an EMIS. Transfer of delivery data to the EMIS. Selection can be made according to time or receipt number.
7.2.2	Event data	F			Only available in combination with an EMIS. Transfer of selected event data to the EMIS. Selection can be time-related.
7.2.3	Sensor monitoring	F			Only available in combination with an EMIS. Transfer of selected sensor-specific data to the EMIS. Selection can be time-related.
8	Reserved				
9	Reserved				
0	Other				
0.1	Sensor monitor	F			Available reports about the sensor interface
0.1.1	Status	F			Report about the current sensor monitor status. Menu item is only available when the sensor interface is active.
0.1.2	Event report	F			Print extract from the logbook in accordance with selected time frame. Contains only sensor events.
0.2	Program update				Available reports about the Program-Update (only MID)
0.2.1	Update report	F			Performed program updates (only MID)

Index

4

4-Star.....92, 306

5

EC-Declaration.....348

A

Access rights115
Actual value106
Additional hose path183
Additional outputs186
Additive92, 306
Additive dispensing78
Additive load86
Additive pump96, 153
Additive pump, cycle time98
Additive, mixing ratio .98, 100, 162, 301
AI15, 16, 32, 34
AIII16
Alarm event180
Alarms29
Approvals345
Assign hose set165
Attributes201
Automatic hose selection76
Auxiliary display25

B

Batteries37
Battery, internal34
Battery, replacement35
Bill126
Bill, gross126
Bill, net126
Billing121
Bio Fuel Oil92, 306
Blow-down146
Butane92, 306

C

Cable33
Calibration46
Calibration accuracy104
Calibration seal258
Calibration status109
CAN61
CAN bus15, 55
CAN-Bus243
Checksum46, 109
Chip35, 42, 50

Chip card ..46, 117, 168, 214, 215, 286
Chip card, configuration168
Chip card, loading parameters170
Chip card, save parameters107
Chip card, saving parameters..169
Chip card, Trip report213
Cleaning34
Cleaning, pressurized water34
Clock34
Commercial customer79
Compartment no.199
Compartment number177
Compensation106, 163, 302
Configuration43, 115
Configuration, Display116, 117
Control electronics16
Currency118, 121, 258, 287
Currency resolution123
Currency symbol123
Currency, applicable118, 287
Currency, EURO122
Currency, exchange rate122
Currency, relevant122
Customer number124
Customer type124

D

Data rate210
Date35
Dead man's switch140
Decimal places123, 161
Default price162, 301
Delay time183, 187
Delivery note69, 79
Delivery preset22
Delivery receipt17, 190
Detailed125, 214, 216
Diagnosis55
Diagnosis, Printer59
Diagnosis, remote control61
Diagnosis. Sensor interface67
Diesel92, 306
Discharge17, 21, 77
Discharge pass144
Discharge preset199
Discharge volume28
Disposal37
Download47
Draining141, 296
Driver155
Driver list219
Driver number123
Dual measuring system139

E

Electrical installation30
Electronic157
Emergency power supply88
EMIS ...77, 84, 119, 125, 212, 230, 231, 232, 242, 288, 307
Enter21
EPE223, 160
EPROM47
Error237
EURO122
Event222, 235, 242
Ex36
Exchange rate118, 287
Extended parameter protection178
External outputs186

F

FDW protocol149, 210, 298
Flameproof enclosure16
Flow147
Flow control141, 296
Flow rate106, 163, 302
Flushing volume131, 289
Form154, 190, 209
Form description154, 300
FTP server84
Function key17
Fuse34

G

GPS77, 224
Grand totals116
Gross price124
Group sensors176
Guarantee33, 278

H

Heating Oil92, 306
Hose path183
Hose path designation188
Hose selection24, 76, 257
Hose set142, 163, 297, 302
Hose volume154

I

Inactivity monitor173, 183
Individual sensors176
Input187
Inspections247
Installation33, 55
Installation, electrical30

Interface type.....	59, 149, 210, 253, 298
Inversion.....	183, 187
Invoice.....	17, 79, 190, 198
IO module.....	229
IO node.....	185
IO-Interface.....	185

J

Jet Fuel.....	92, 306
Jumper.....	112

K

Kerosene.....	92, 306
---------------	---------

L

Language query.....	124
Languages.....	15
Link.....	186
Load monitor.....	86
Log.....	224
Log book.....	29
LPG.....	92, 306

M

Main.....	43
Main display.....	25
Maintenance.....	34
Manufacturer.....	38
Master access.....	118, 156
Measuring.....	71, 161
Measuring system flushing.....	159
Measuring systems.....	38
Menus.....	39
Meter factor.....	105, 106, 163, 302
Meter factor, additive pump.....	97
MF-EPS.....	88
MID.....	46, 48
Minimum.....	202
Minimum discharge volume.....	24
Minimum product temperature.....	165

N

Net price.....	124
----------------	-----

O

OBC.....	83, 121, 139, 160
OBC flushing monitor.....	131, 289
OBC operating mode.....	140
Office interface.....	84, 125
Office transfer.....	230
Offline event data.....	173
Offline events.....	172
OIML R117.....	15, 243, 347
Online event data.....	174
Online mode.....	173
Operating elements.....	16

Operating mode.....	118, 287
Operation mode.....	121
Operational checks.....	37
Order no.....	199
Output.....	186
Outputs.....	186
Overfill prevention.....	140

P

Packed good.....	78
Parameter.....	166
Parameter list.....	51, 117
Parity.....	59
Parity check.....	149, 210, 253, 298
Password.....	32, 45, 111, 115
Path selection.....	141, 295
Piston capacity.....	97
Placeholders.....	200
Power failure switch.....	89
Power supply.....	243
Pre-set.....	123
Preset amount.....	78
Preset discharge quantity.....	71
Price factor.....	96, 100, 101, 162, 302
Price, gross.....	124
Price, net.....	124
Print.....	21
Printer ..	15, 30, 31, 33, 43, 59, 149
Printer access.....	139
Printer selection.....	149, 253, 298
Printer settings.....	149
Printer, Diagnosis.....	59
Printer, ribbon.....	81
Private customer.....	79
Product	24, 70, 93, 94, 98, 104, 154, 237, 258
Product changes....	72, 73, 74, 258
Product code.....	70
Product definition.....	93
Product load.....	86
Product register.....	92, 306
Product transfer ..	87, 199, 201, 259
Product, barred.....	102
Product, configuration.....	99
Product, containing additive.....	98
Propane.....	92, 306
PT 100.....	152
Pulse counter.....	150, 299
Pulse rating.....	150, 299
Pulse sensor.....	55

Q

Queries.....	121
Query options.....	123
Query, customer number.....	124
Query, customer type.....	124
Query, driver number.....	123

Query, language.....	124
Quick.....	19

R

Receipt.....	190, 193
Receipt, copy ...	119, 212, 288, 306
Reference.....	109
Remote control.....	55, 82, 140, 258
Remote control, diagnosis.....	61
Report.....	44
Report, detailed.....	125, 214, 216
Report, event report ..	222, 235, 242
Request interval.....	177
Residue removal pump.....	74
RS-232.....	59
RS-485.....	59

S

Safety.....	34
Safety regulations.....	38
Scale prices.....	96, 165
Screen connection.....	31
Seal.....	32, 117, 201
Seal status.....	109
Seal switch.....	113
Self loading.....	87, 199, 259
Self-loading.....	201
Sensor.....	56
Sensor interface, Diagnosis.....	67
Sensor module.....	225, 226
Sensor monitor.....	225
Sensor monitor status report...	180, 233
Sensor type.....	150, 225, 299
Sensor, NPN.....	151
Sensor, PNP.....	151
Sensor, THS.....	151
Sensors.....	55, 178
Service.....	46
Service department.....	283
Service functions.....	157, 158
Setup.....	39, 114
shield.....	31
Short report.....	215
SI node.....	177
Spacing.....	190
Spare.....	278
Start.....	21
Start sensor group.....	179
Status information.....	175
Stop.....	21
Sum.....	204
Super-Unleaded.....	92, 306
Surcharge.....	121
SysInf.....	224

T

Target value	106
Tax rate	101
TDL.....	83, 258
Temperature input.....	243
Temperature offset.....	152
Temperature sensor	32, 55, 257
Test	39
Text, entry of	18
Time	35
TMC 118, 121, 133, 139, 258, 287, 290	
Tour report.....	44
Trailer cable.....	34
Transfer rate.....	149, 253, 298
Transmission delay	177
Transmission delay	185
Transport duty	92, 306

Trigger interval.....	177
Trip.....	213, 214
Trip report	44
Type approval	347

U

Units.....	161
Unleaded	92, 306
Update	46, 47
Update report.....	232
Upper and lowercase selection .	17
Use hose path.....	188
Use IO.....	185
Use SI	177

V

Valve	58, 87, 140, 141, 165
Valve assignments	58

Valve control, electronic.....	143
Version number.....	45
Voltage supply	37

W

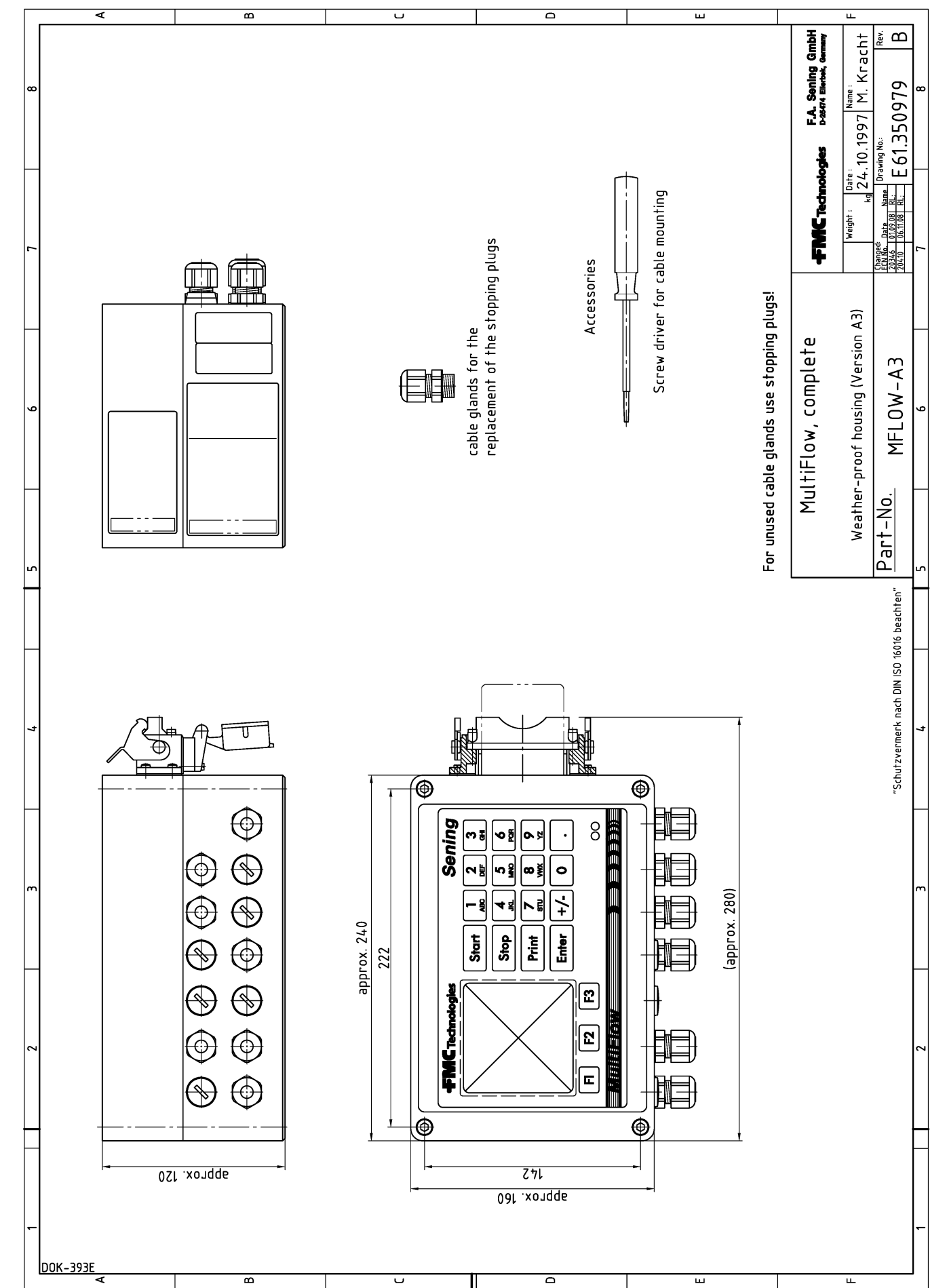
W.....	131
W&M Restrictions	131, 289
W&M seal.....	109, 110, 112, 114
Wire end sleeves	31

Z

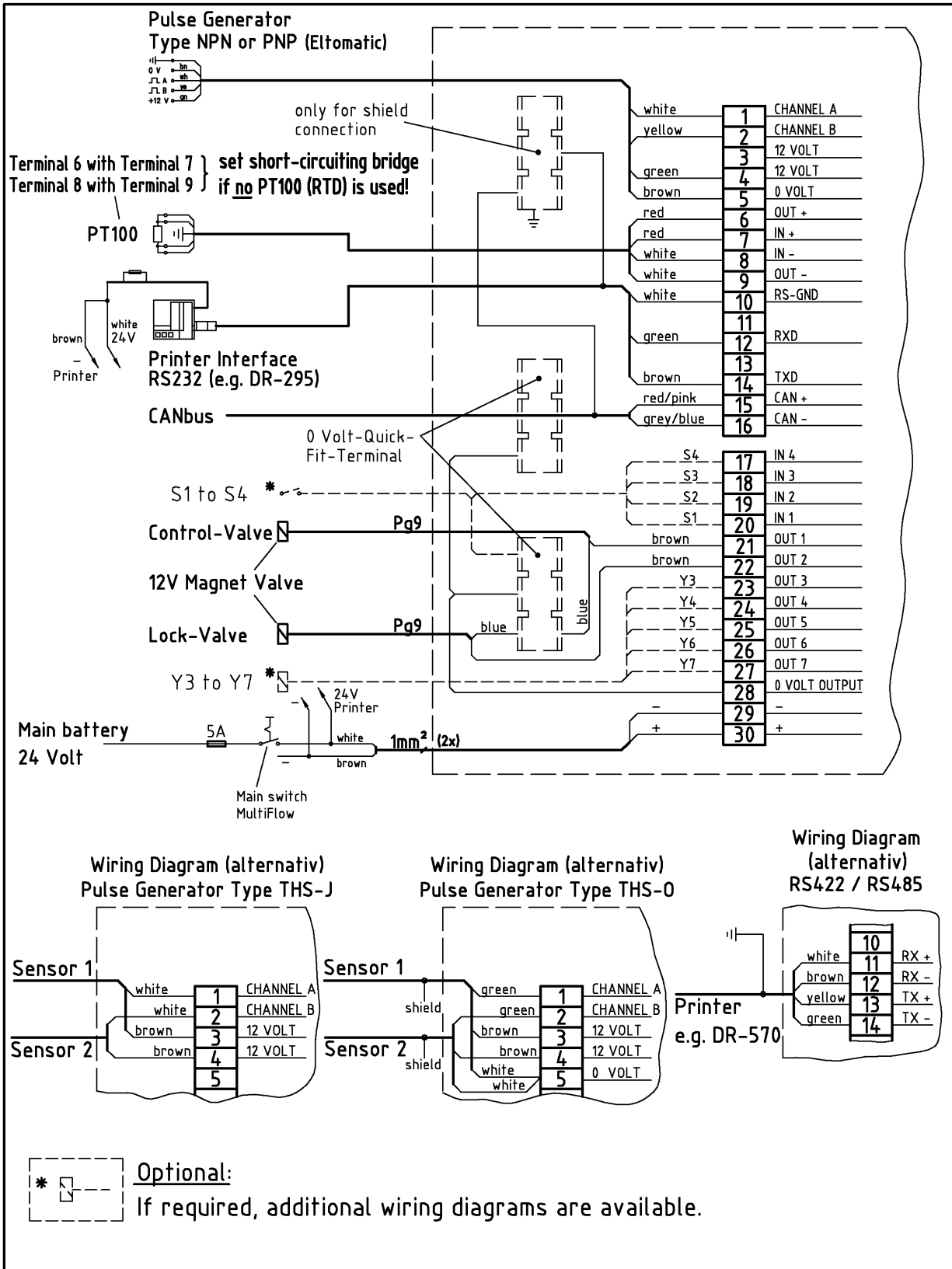
Zero bill	218
Zulassungsdokumente.....	347

Drawings

E61.350979 - MultiFlow complete - Weather-proof housing (All version)



E51.350956 - Wiring Diagram for MultiFlow (All version)



DOK-383E;DOK-393E
"Schutzvermerk nach DIN 34 beachten"

Wiring Diagram
for MultiFlow
Weather-proof housing (Version A3)

FMC EnergySystems
FMC Measurement Solutions

F.A. Sening GmbH
D-25474 Ellerbek, Germany

Changed :
07.05.02 NB; 24.06.02 NB;
15.02.05 RL;

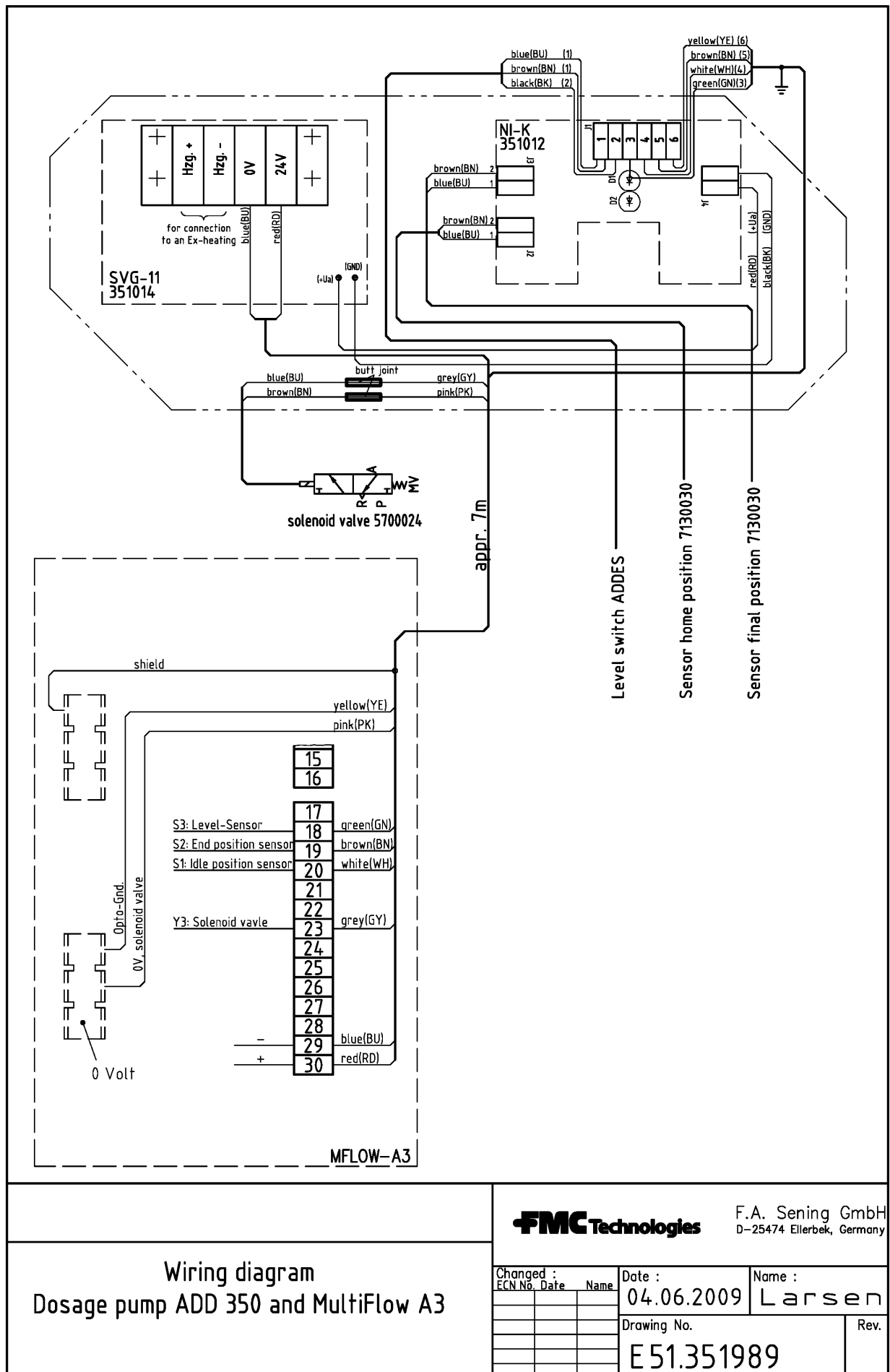
Date :
13.11.1998

Name :
Kracht

Drawing No.
E51.350956

Rev.
C

E51.351989 - Wiring diagram Dosage pump ADD350 and MultiFlow AIII



“Schutzvermerk nach DIN ISO 16016 beachten”

FMC Technologies

F.A. Sening GmbH
D-25474 Ellerbek, Germany

Wiring diagram
Dosage pump ADD 350 and MultiFlow A3

Changed :
ECN No. Date Name

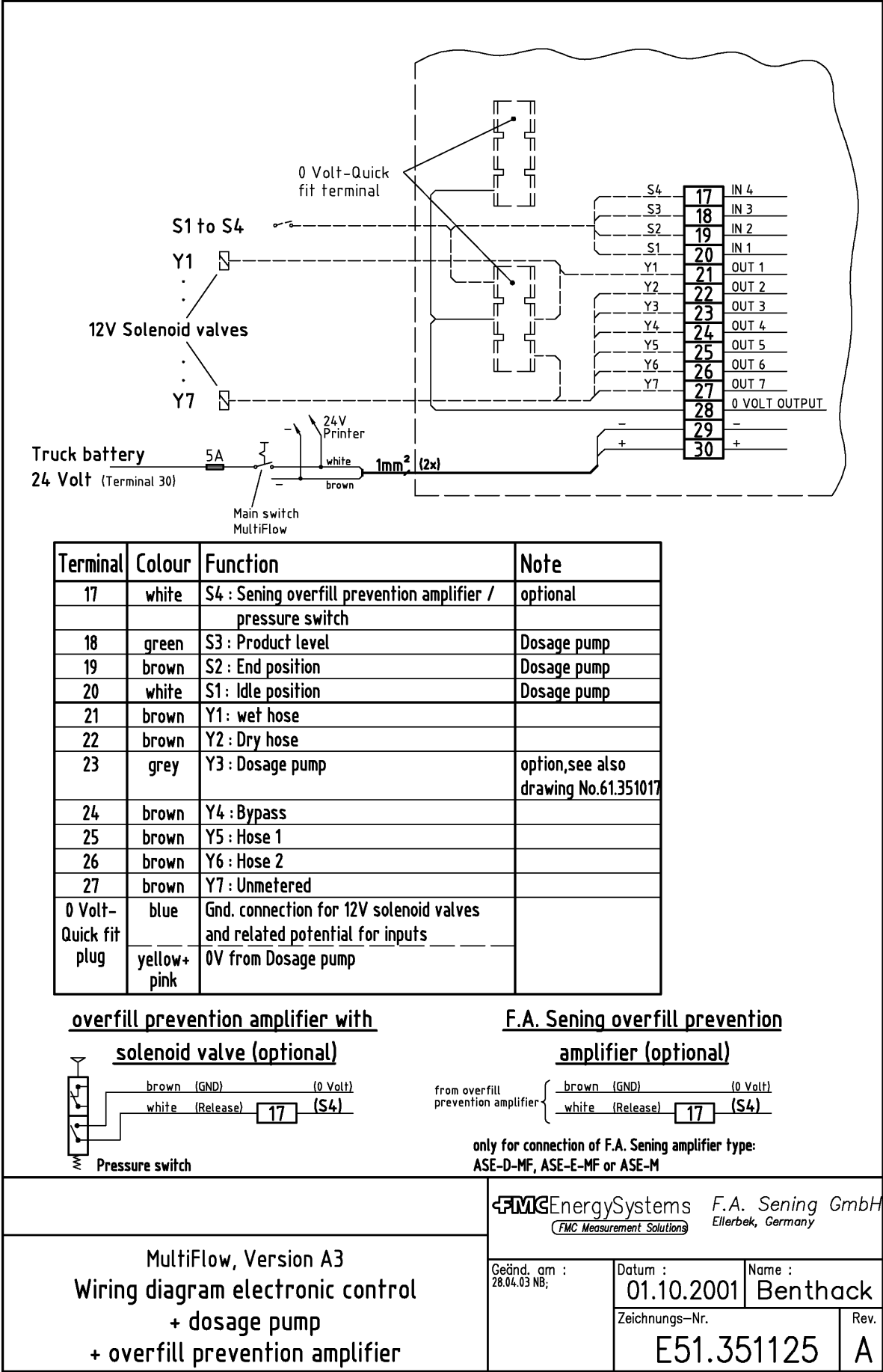
Date :
04.06.2009

Name :
Larsen

Drawing No.

E 51.351989

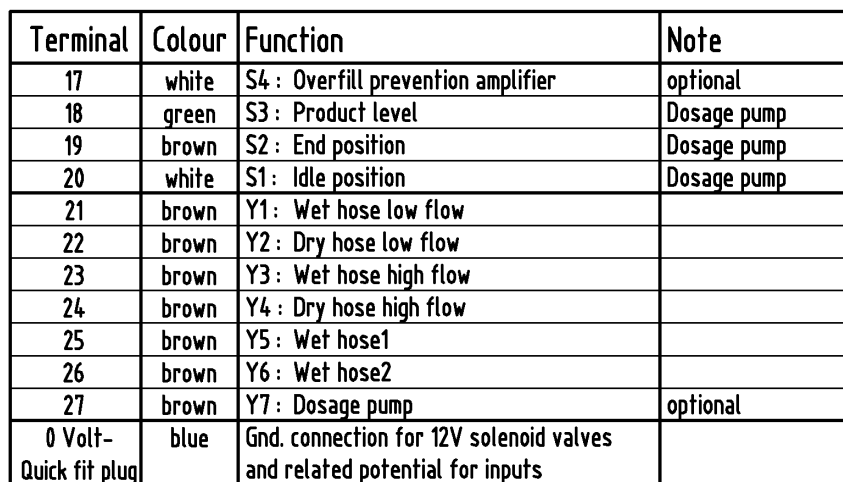
Rev.



DOK-383E
"Schutzvermerk nach DIN 34 beachten"

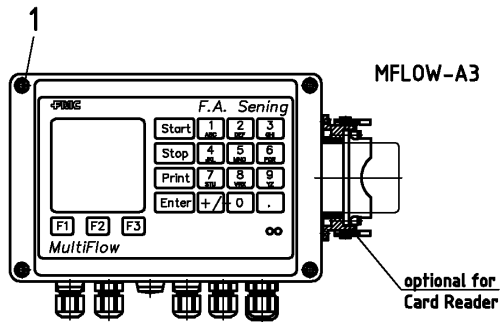


DOK-383E
"Schutzvermerk nach DIN 34 beachten"

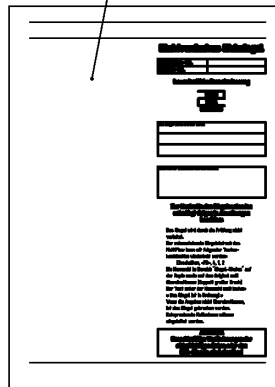


<p>MultiFlow, Version A3</p> <p>Wiring diagram electronic control with flow control +dosage pump + overfill prevention amplifier</p>	<p>FMCEnergySystems F.A. Sening GmbH FMC Measurement Solutions D-25474 Ellerbek, Germany</p>		
	<p>Geänd. am :</p>	<p>Datum : 24.02.2003</p>	<p>Name : Benthack</p>
		<p>Zeichnungs-Nr. E51.351691</p>	<p>Rev.</p>

Sealing Arrangement



2 Check electronic W&M-Seal in the measurement system certificate!



DOK-383E
"Schutzvermerk nach DIN 34 beachten"

Sealing Arrangement for MultiFlow
Version A3



F.A. Sening GmbH
An FMC Corporation subsidiary

Geänd. am :

Datum :

06.03.2000

Name :

M. Kracht

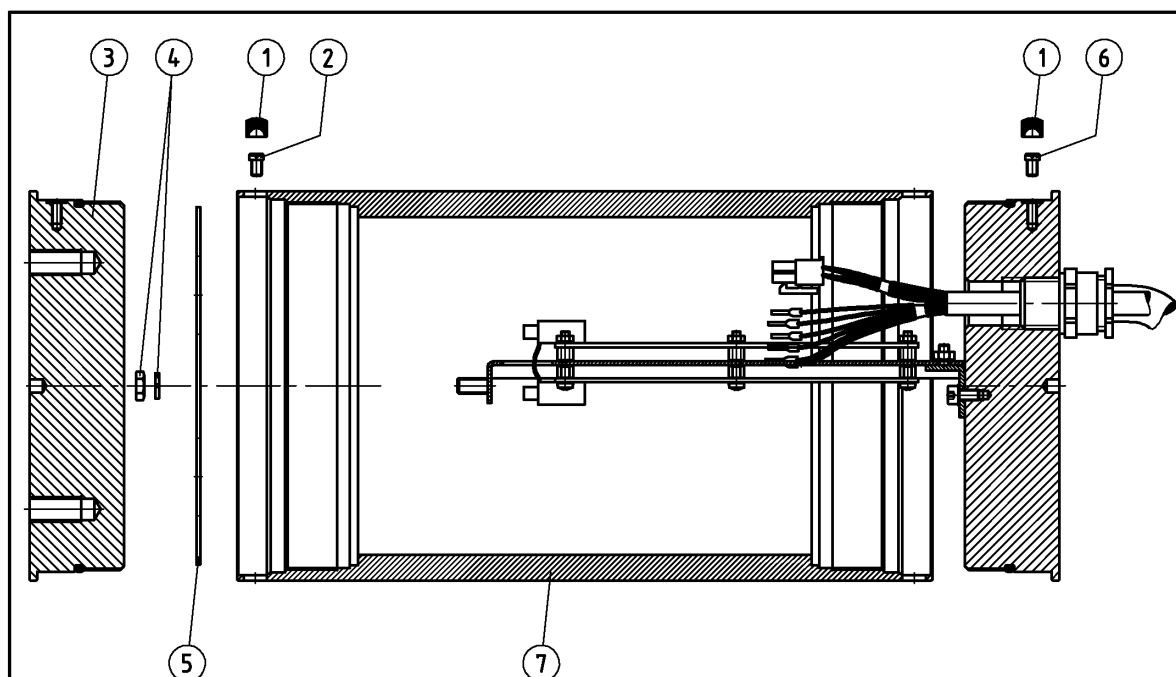
Zeichnungs-Nr.

E52.350953

Rev.

Sealing Arrangement		
Sealing Position	Number	
<u>MFLOW-A3</u>		
1 Housing	1	
2 Seal document (DOK-386E)		

<h2 style="text-align: center;">Sealing Arrangement for MultiFlow Version A3</h2>	F.A. Sening GmbH <small>An FMC Corporation subsidiary</small>		
	Geänd. am :	Datum : 06.03.2000	Name : M. Kracht
		Zeichnungs-Nr. E52.350953	Rev.



- ① Remove the lead seals
- ② Unscrew the "slotted pan head screw"
- ③ Unscrew / open the cover
- ④ Remove the hexagon nut (2x) and the toothed lock washer (2x)
- ⑤ Pull the disk out of the pipe (housing)
- ⑥ Unscrew the "slotted pan head screw"
- ⑦ Unscrew the pipe (housing) from the cover

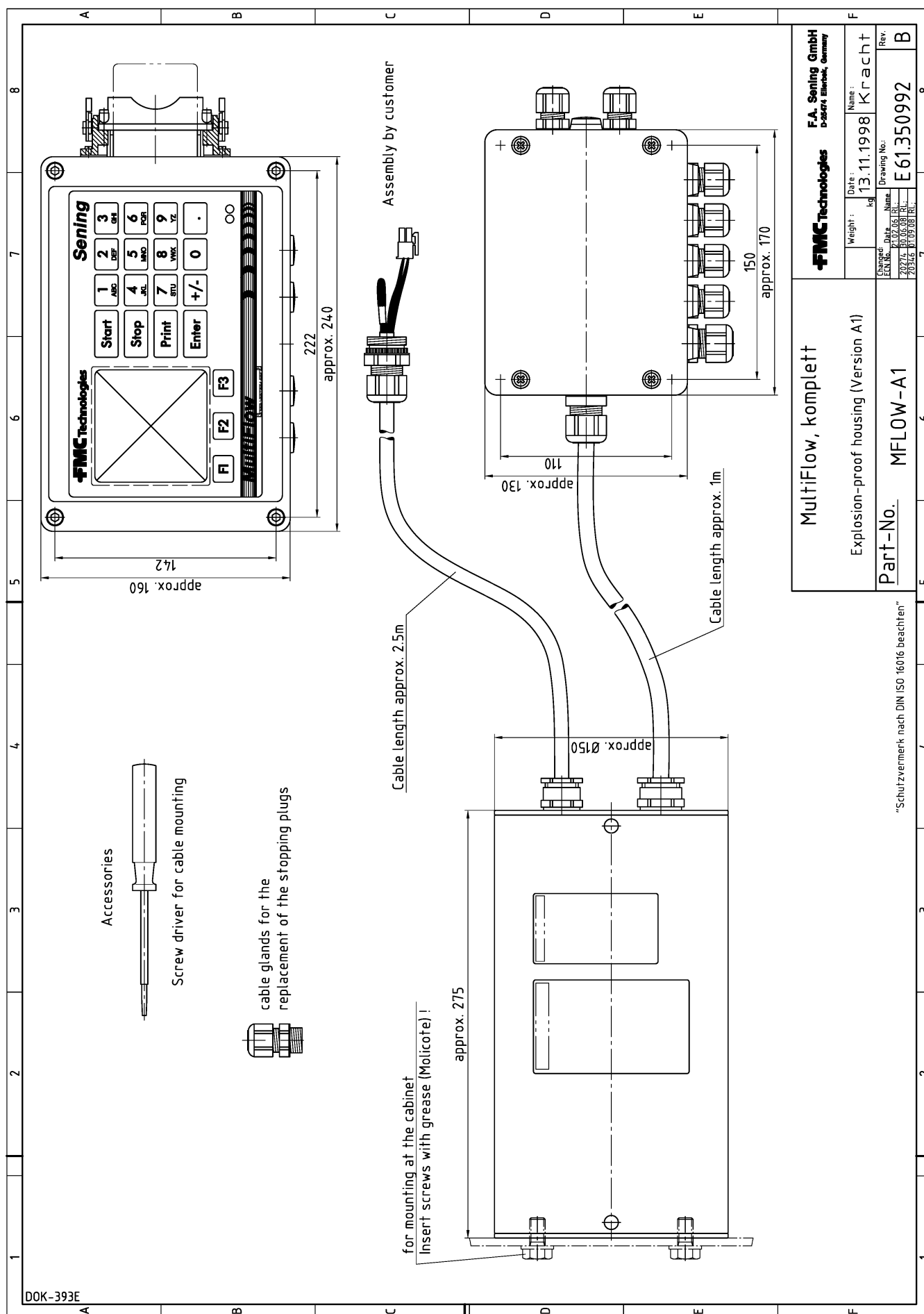
Take care:

O-Ring seals (Cover) must be greased!

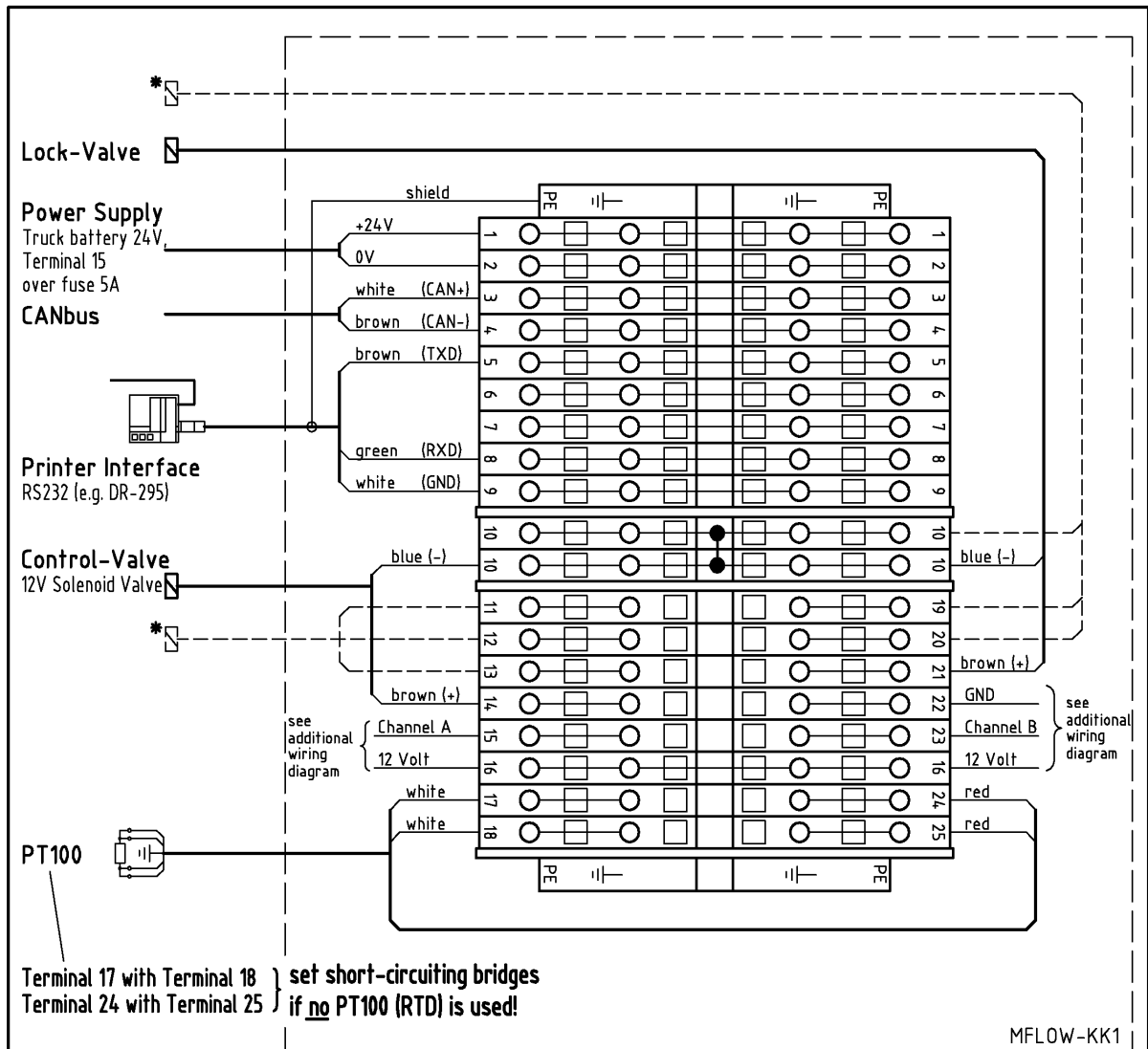
DOK-365E, DOK-383E

"Schutzvermerk nach DIN 34 beachten"

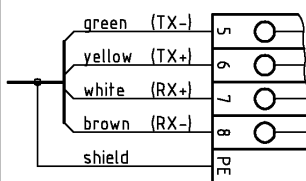
		FMC EnergySystems F.A. Sening GmbH FMC Measurement Solutions D-25474 Ellerbek, Germany	
<i>Disassembly of the Ex-housing</i>	Changes :	Date : 08.07.2003	Name : Benthack
		Drawing No. E51.351100	Rev.



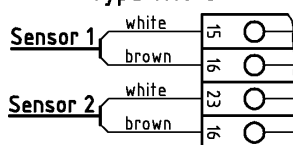
E51.350958 - Wiring Diagram for MultiFlow (AI version)



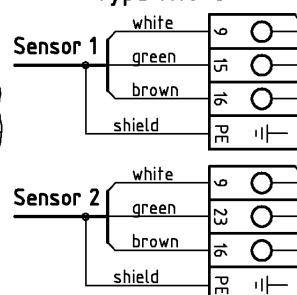
Wiring Diagram
RS422 / RS485



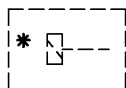
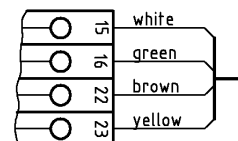
Anschlußplan
Pulse Generator
Type THS-J



Wiring Diagram
Pulse Generator
Type THS-O



Wiring Diagram
Pulse Generator
Type NPN or PNP
(Eltomatic)



Optional:

If required, additional wiring diagrams are available.

DOK-383E; DOK-393E
"Schutzvermerk nach DIN 34 beachten"

Wiring Diagram
for MultiFlow
Explosion-proof housing (Version A1)

FMC EnergySystems
FMC Measurement Solutions

F.A. Sening GmbH
D-25474 Ellerbek, Germany

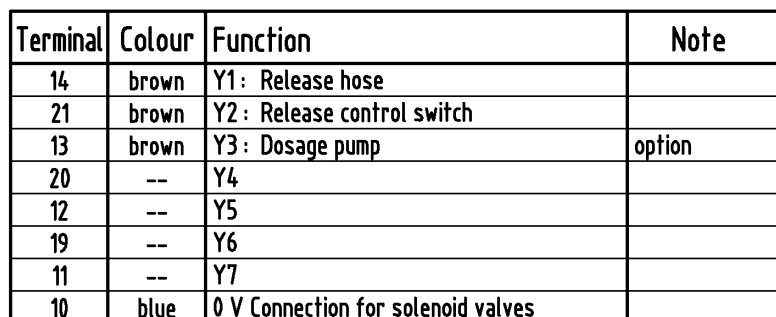
Changed :
01.10.01 NB; 07.05.02 NB;
24.06.02 NB; 15.02.05 RL

Date :
10.11.1998

Name :
M. Kracht

Drawing No.
E51.350958

Rev.
D

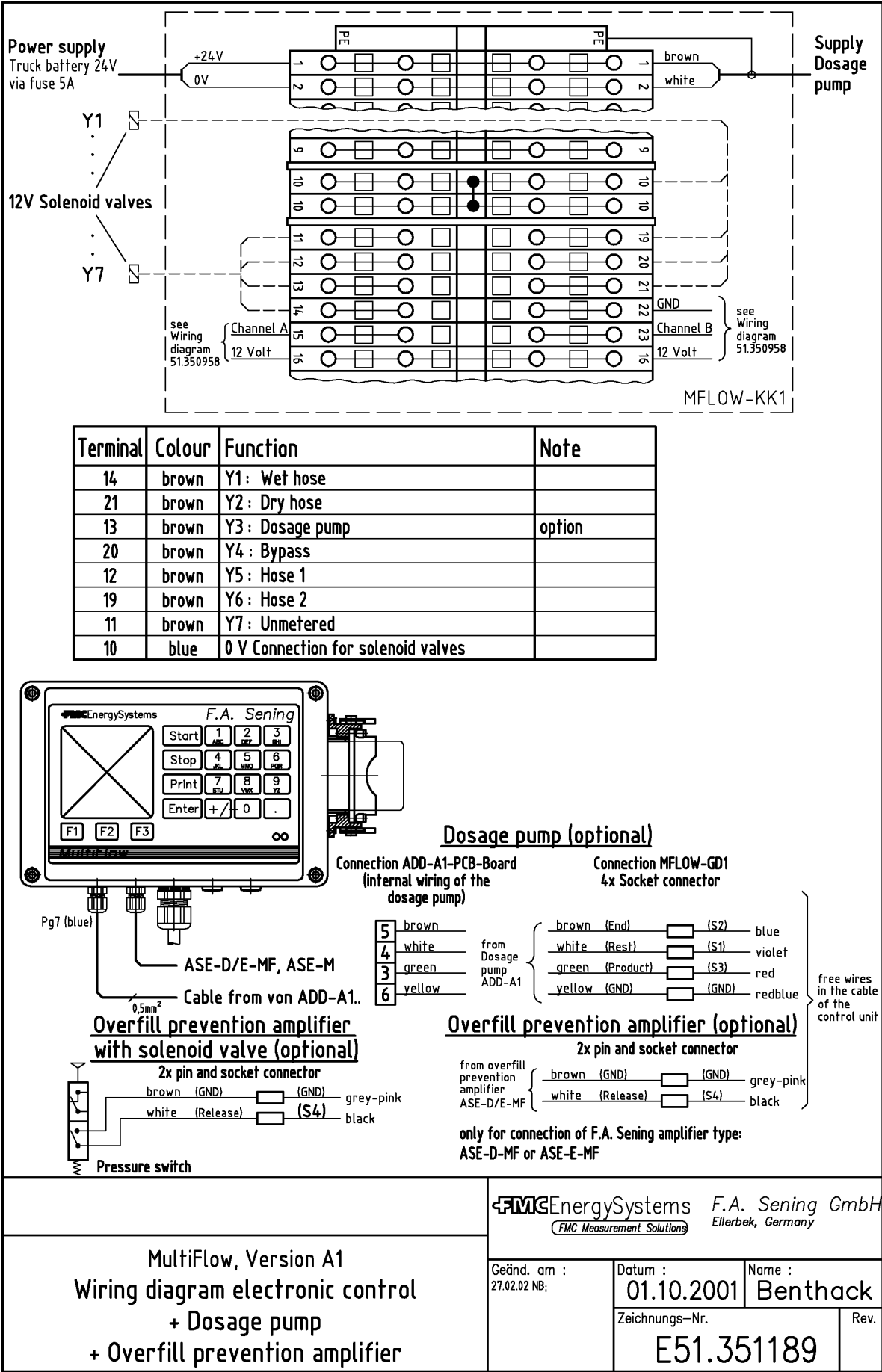


Connection MFLOW-GD1
4x Socket connector

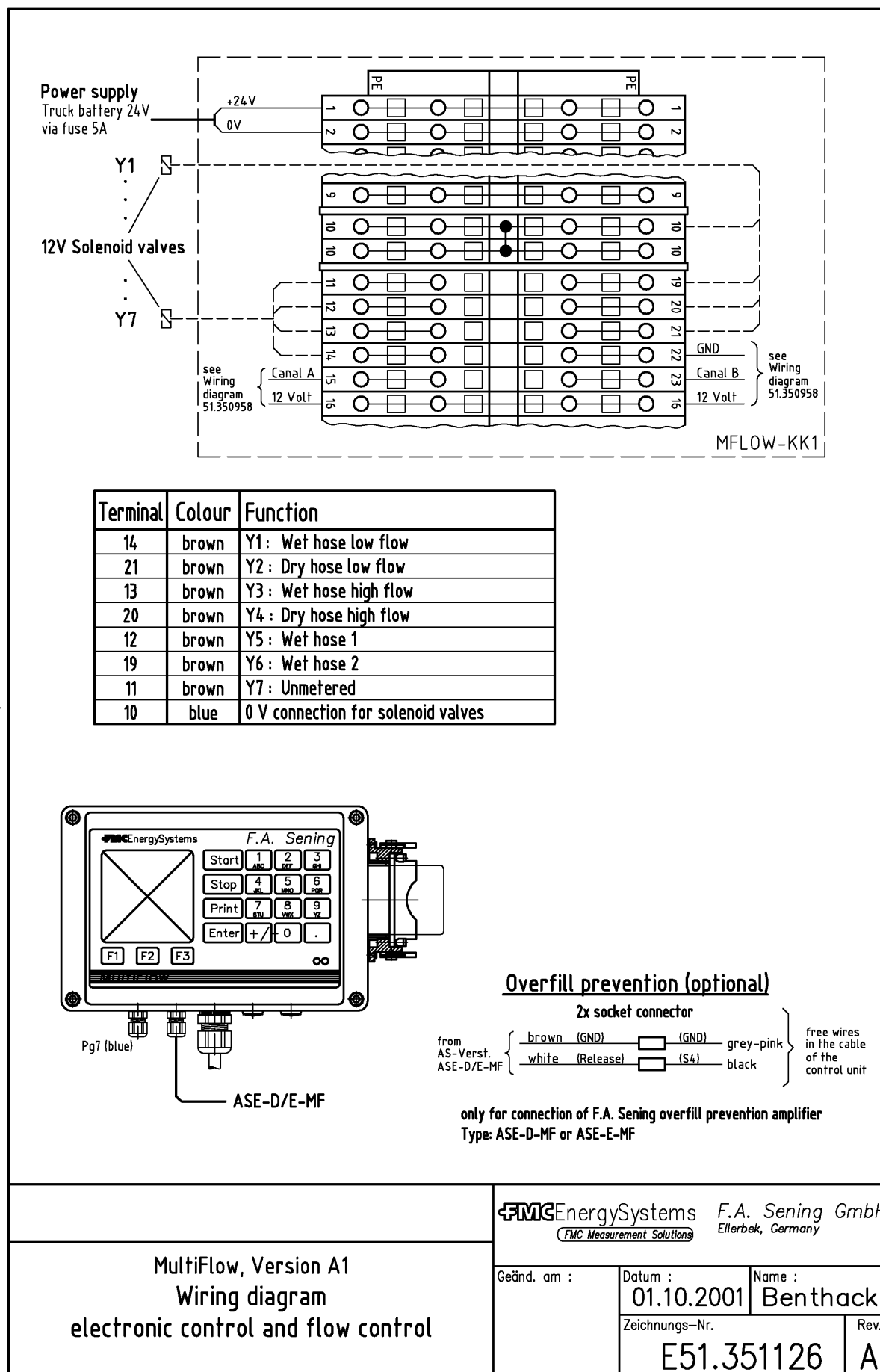
<div style="border: 1px solid black; padding: 2px; display: inline-block; text-align: center;">5</div>	brown	from Dosage pump ADD-A1	{	brown (End)	(S2)	blue	} free wires in the cable of the control unit
	white			white (Rest)	(S1)	violet	
	green			green (Product)	(S3)	red	
	yellow			yellow (GND)	(GND)	redblue	

FMG Energy Systems F.A. Sening GmbH
 FMG Measurement Solutions Ellerbek, Germany

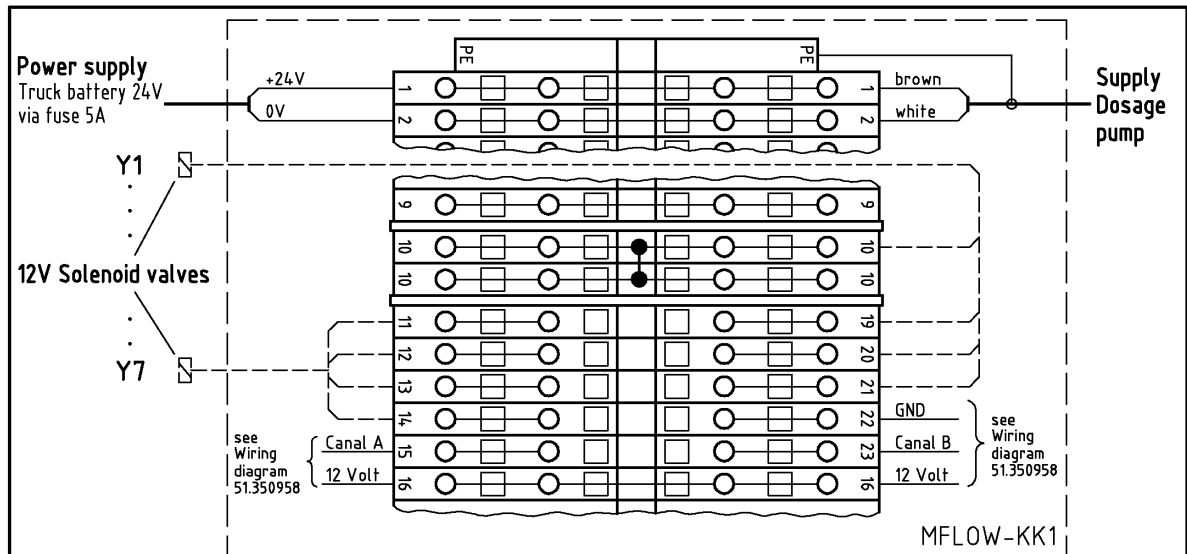
E51.351190



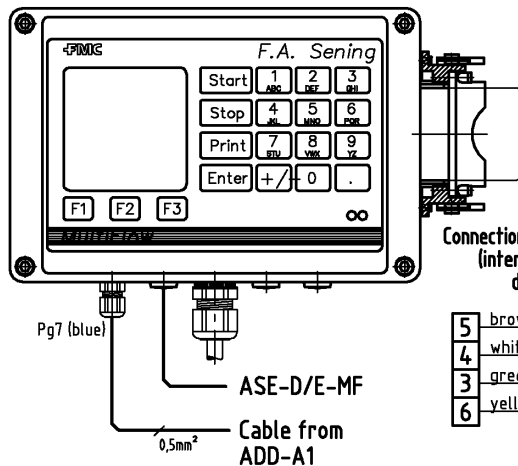
DOK-321DOK-383
"Schutzvermerk nach DIN 34 beachten"

DOK-383E
"Schutzvermerk nach DIN 34 beachten"

E51.351692 - MultiFlow AI Wiring diagram electronic control with flow control + dosage pump + overflow prevention amplifier



Terminal	Colour	Function	Note
14	brown	Y1: Wet hose low flow	
21	brown	Y2: Dry hose low flow	
13	brown	Y3: Wet hose high flow	
20	brown	Y4: Dry hose high flow	
12	brown	Y5: Wet hose1	
19	brown	Y6: Wet hose2	
11	brown	Y7: Dosage pump	optional
10	blue	0 V Connection for solenoid valves	



Dosage pump (optional)

Connection ADD-A1-PCB-Board
(internal wiring of the dosage pump)

Connection MFLOW-GD1
4x Socket connector

5	brown
4	white
3	green
6	yellow

from Dosage pump ADD-A1	brown (End)	(S2)	blue	free wires in the cable of the control unit
	white (Rest)	(S1)	violet	
	green (Product)	(S3)	red	
	yellow (GND)	(GND)	redblue	

Overflow prevention (optional)

2x socket connector

from AS-Verst. ASE-D/E-MF	brown (GND)	(GND)	grey-pink	free wires in the cable of the control unit
	white (Release)	(S4)	black	

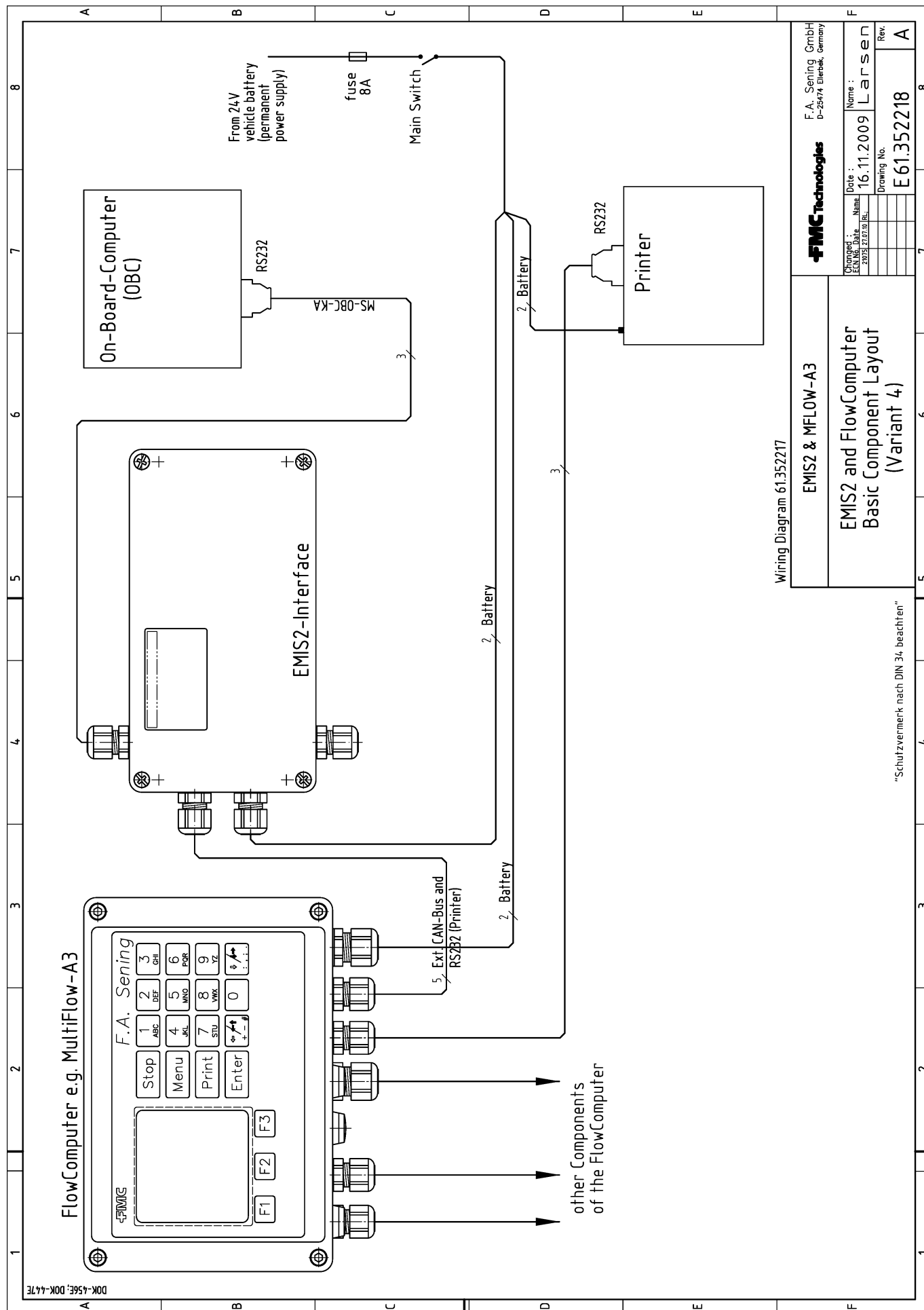
only for connection of F.A. Sening overflow prevention amplifier
Type: ASE-D-MF or ASE-E-MF

DOK-383E "Schutzvermerk nach DIN 34 beachten"

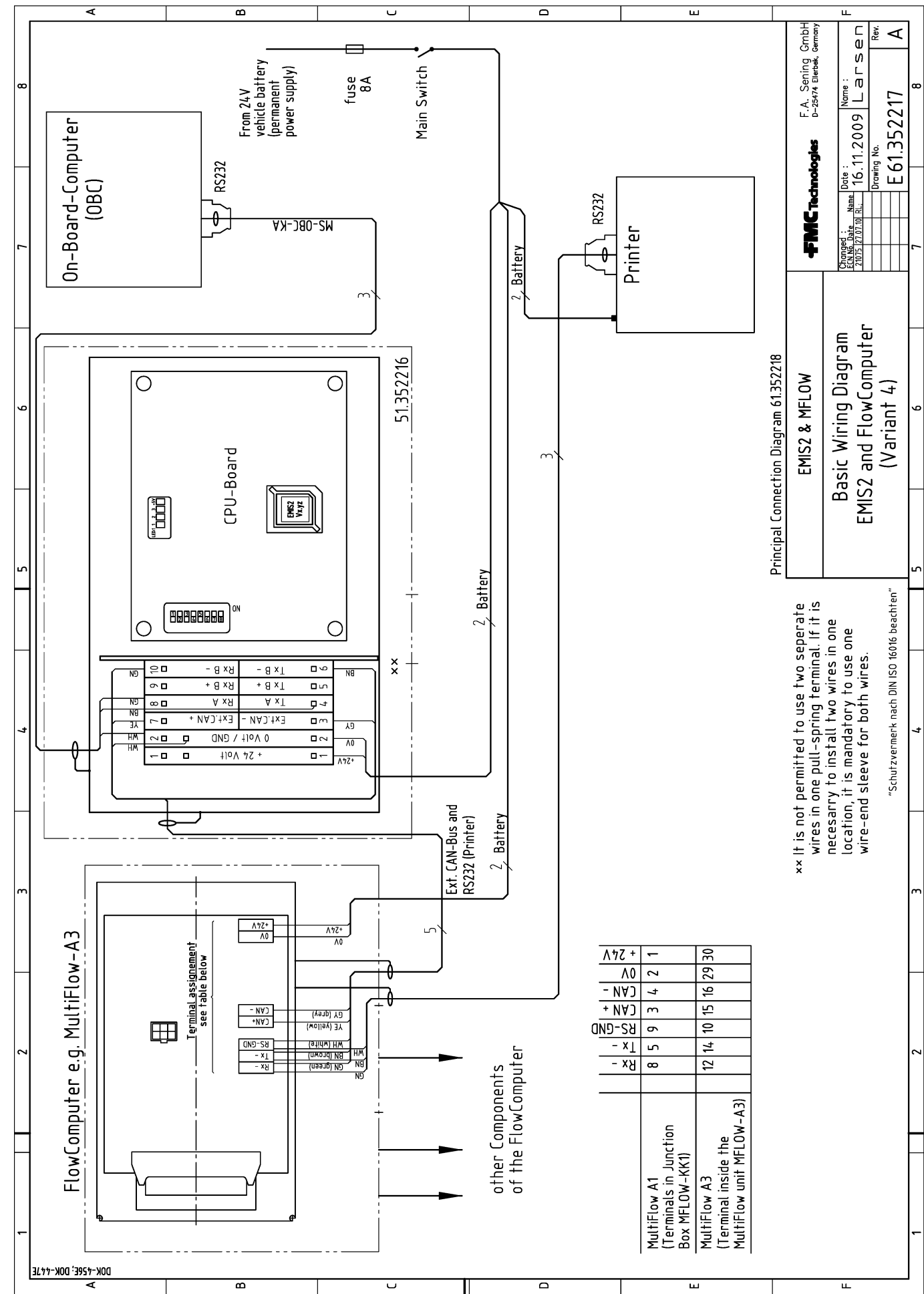
MultiFlow, Version A1 Wiring diagram electronic control with flow control +dosage pump + overflow prevention amplifier	FMC EnergySystems F.A. Sening GmbH FMC Measurement Solutions D-25474 Ellerbek, Germany	
	Geänd. am : Datum : 24.02.2003 Zeichnungs-Nr. E51.351692	Name : Benthack Rev.





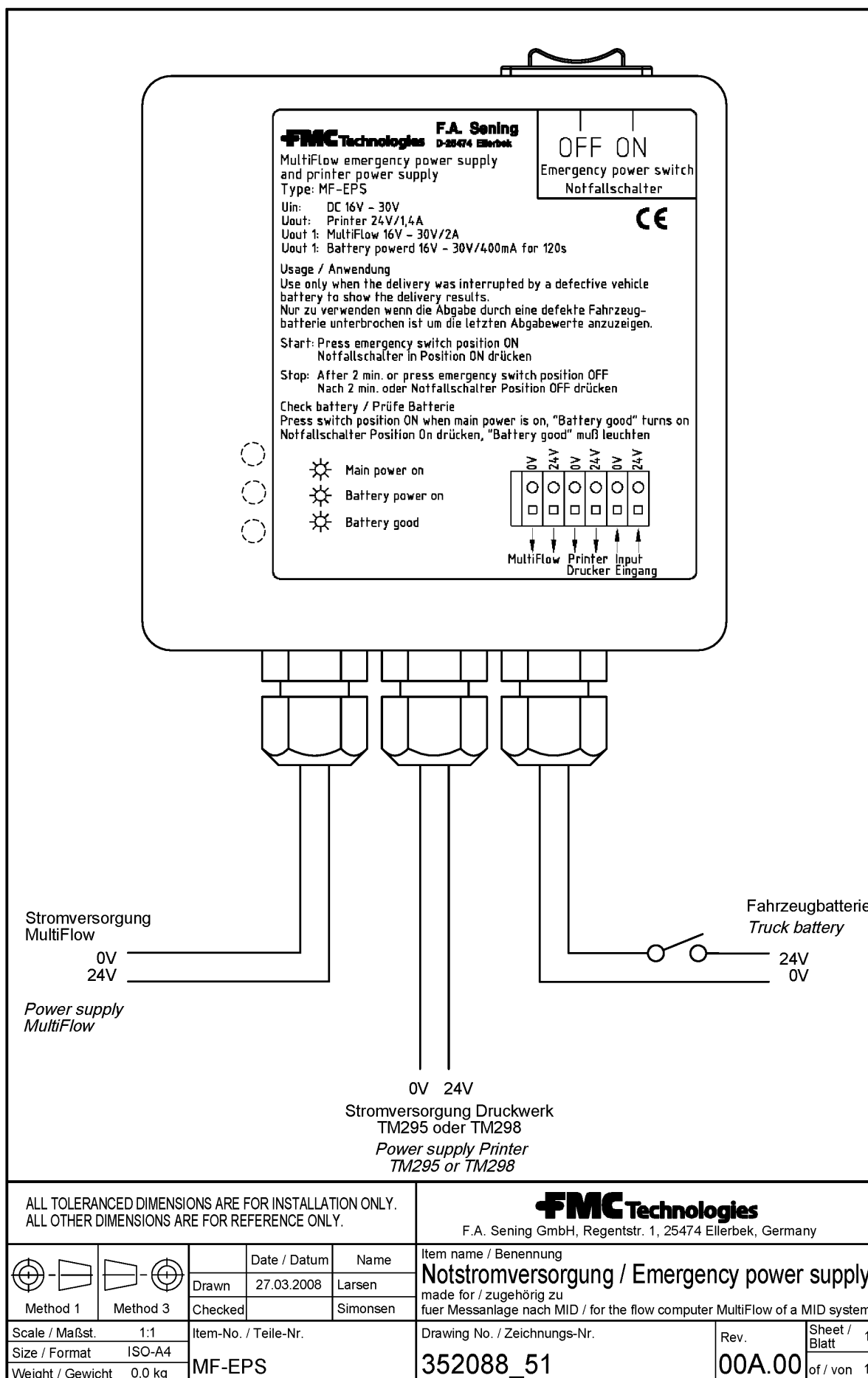


E61.352217 - Basic Wiring Diagram EMIS and FlowComputer (Variant 4)

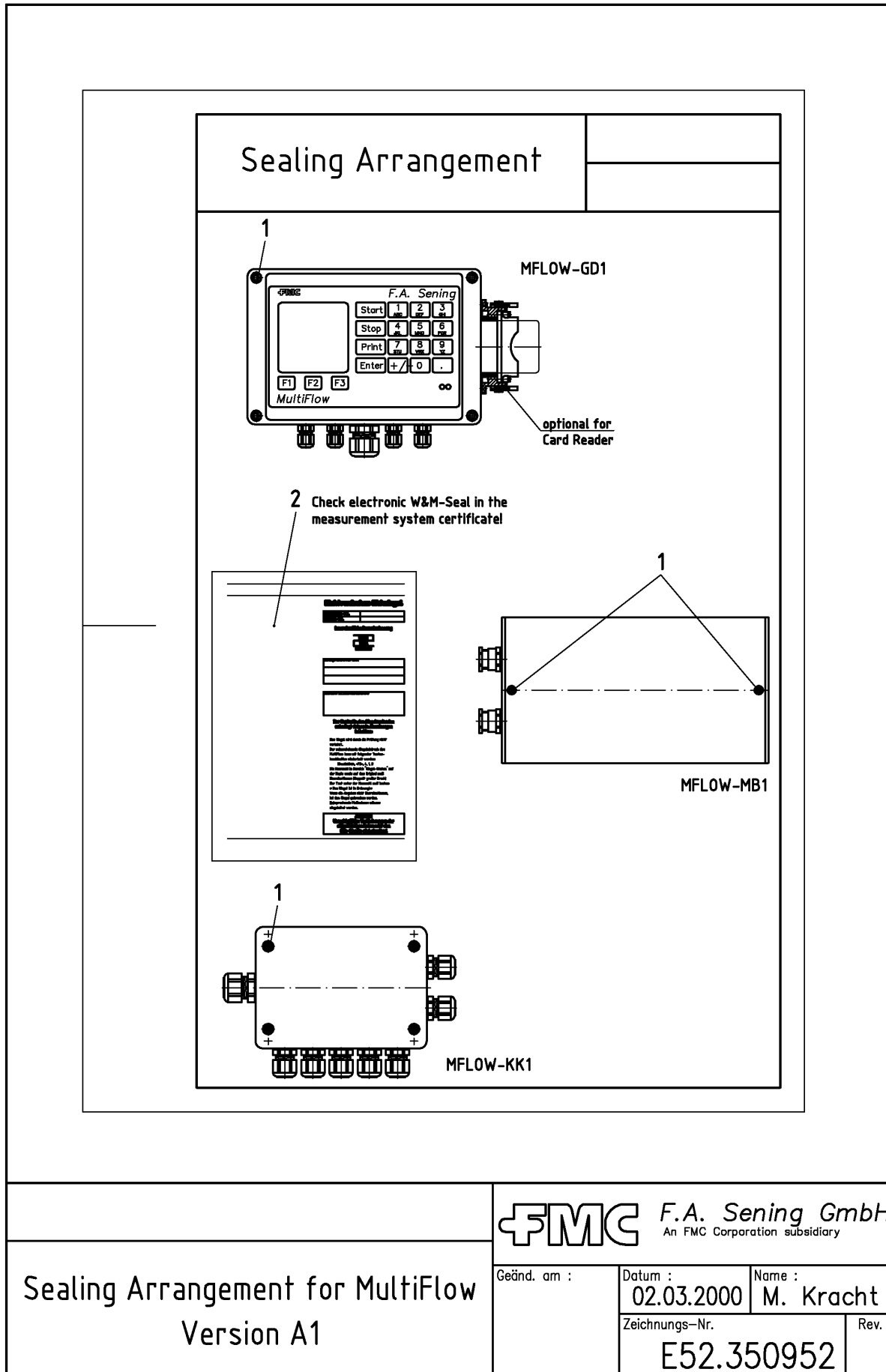




E51.352088 - Emergency power supply for the flow computer MultiFlow of a MID system



Copyright protection according to DIN ISO 16016
"Schutzvermerk nach DIN ISO 16016 beachten"



Sealing Arrangement	

Sealing Position

Number

MFLOW-GD1

1 Housing

1

MFLOW-MB1

1 Housing

2

MFLOW-KK1

1 Housing

1

2 Seal document (DOK-386E)

DOK-383E
"Schutzvermerk nach DIN 34 beachten"

Sealing Arrangement for MultiFlow
Version A1



F.A. Sening GmbH
An FMC Corporation subsidiary

Geänd. am :

Datum :

02.03.2000

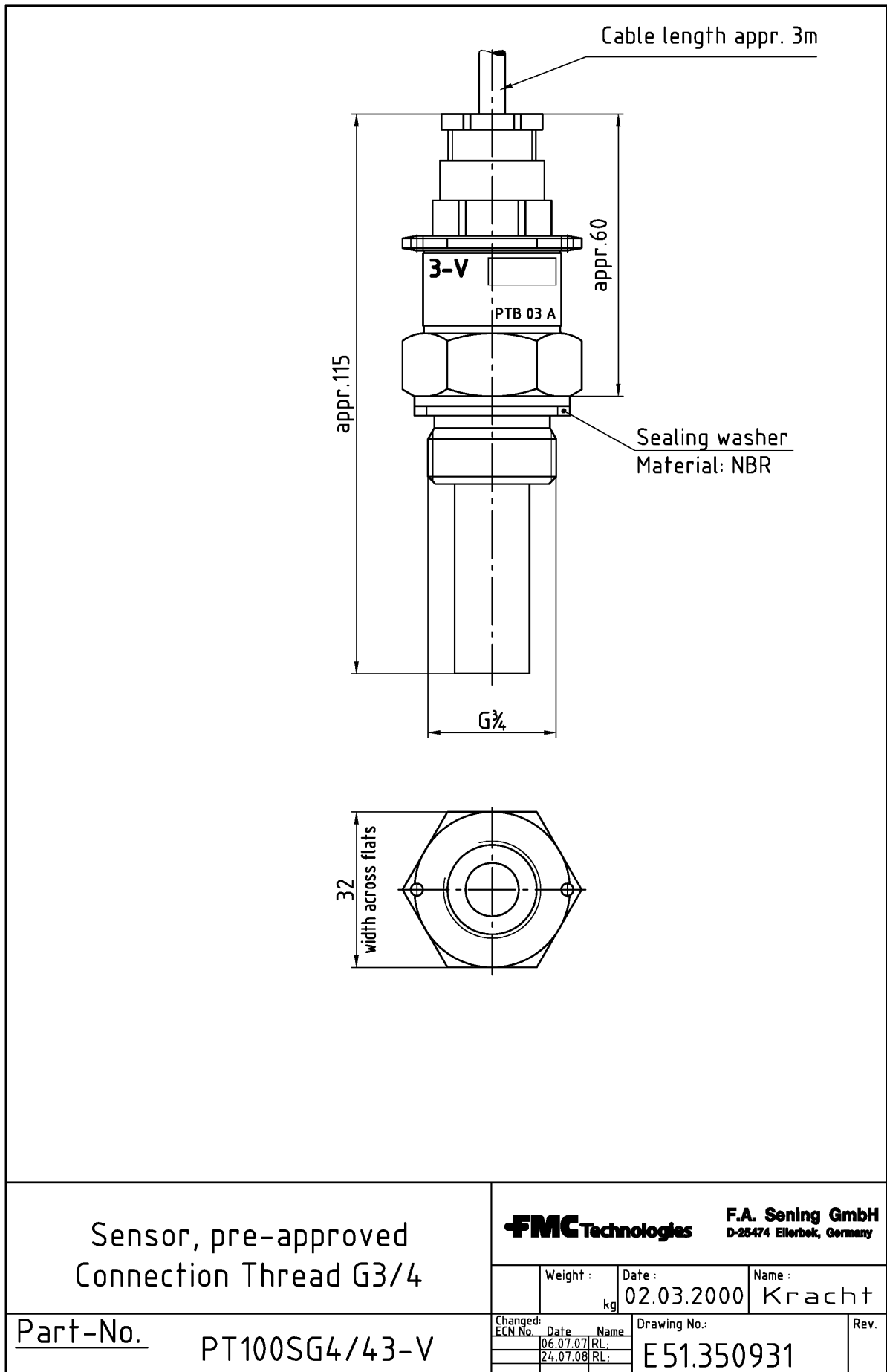
Name :

M. Kracht

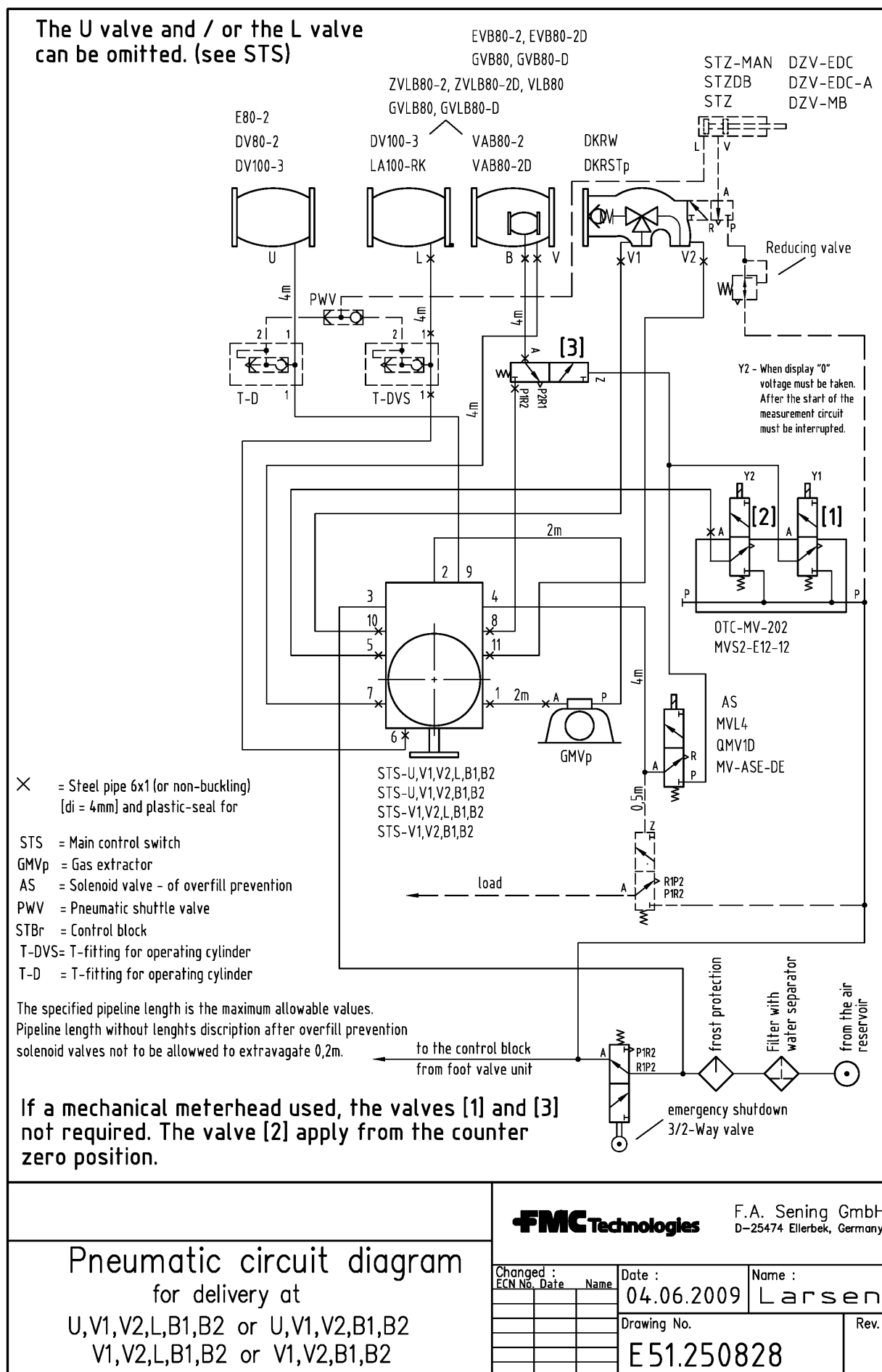
Zeichnungs-Nr.

E52.350952

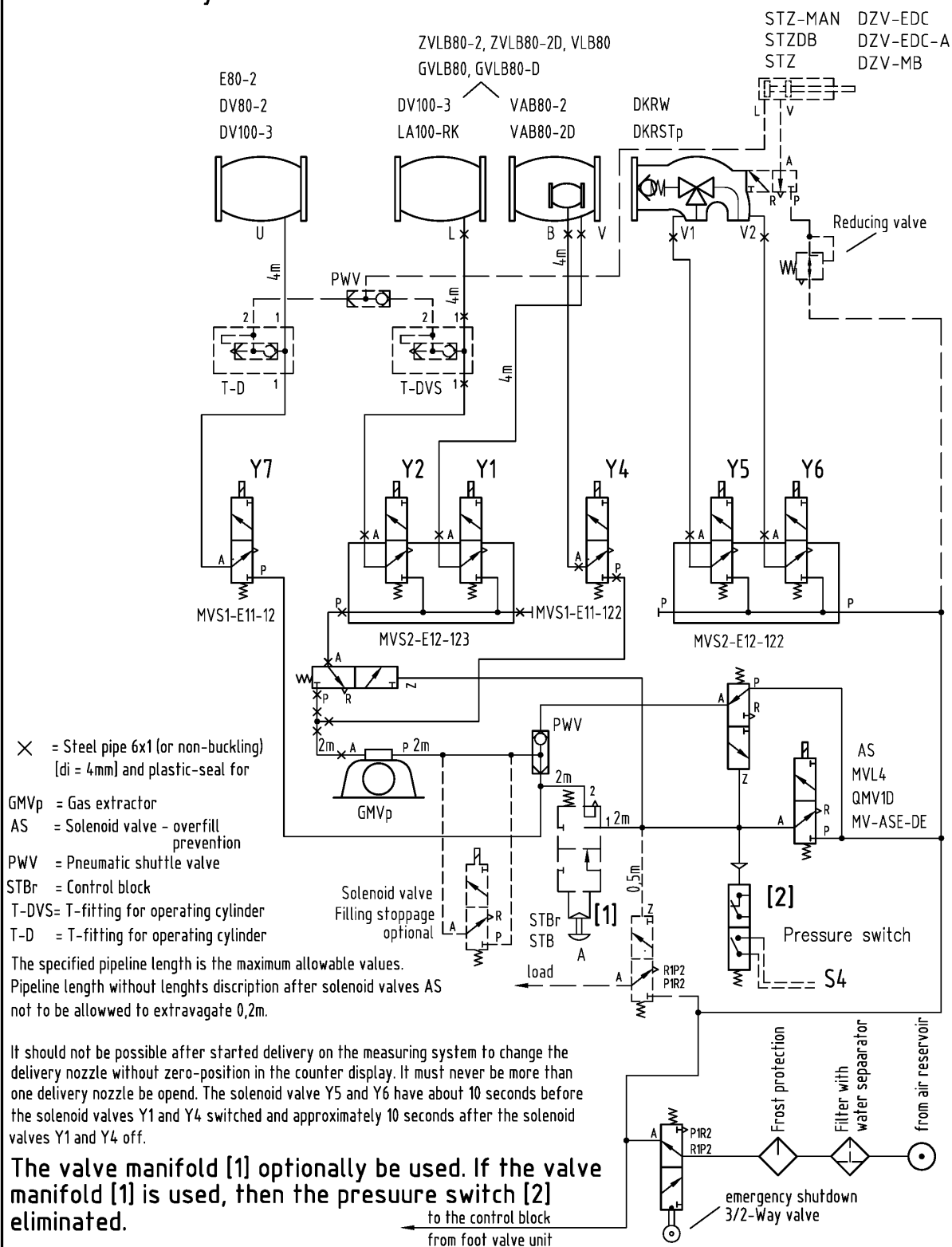
Rev.



DOK-383E
"Schutzvermerk nach DIN ISO 16016 beachten"



The U-valve may be omitted.



“Schutzvermerk nach DIN ISO 16016 beachten”

Pneumatic circuit diagram
Meter package with tank truck computer (TMU)
for delivery at
U,V1,V2,L,B1,B2 or V1,V2,L,B1,B2

FMC Technologies

F.A. Sening GmbH
D-25474 Ellerbek, Germany

Changed :
ECN No. Date Name

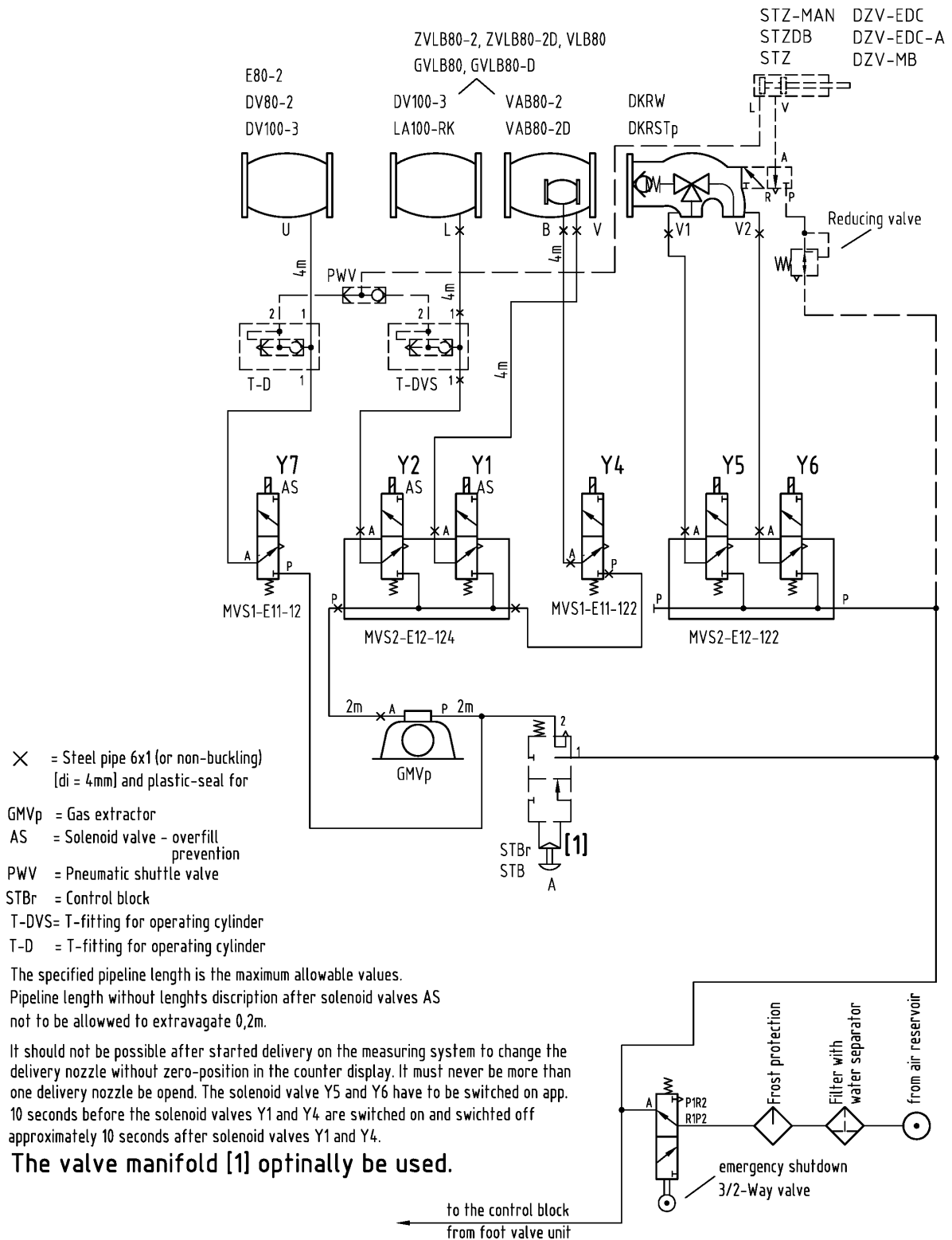
Date :
04.06.2009

Name :
Larsen

Drawing No.
E51.250842

Rev.

The U-valve may be omitted.



"Schutzvermerk nach DIN ISO 16016 beachten"

Pneumatic circuit diagram

Meter package with tank truck computer (TMU+AS)

U,V1,V2,L,B1,B2 or V1,V2,L,B1,B2

FMC Technologies

F.A. Sening GmbH
D-25474 Ellerbek, Germany

Changed :
ECN No. Date Name

Date :
04.06.2009

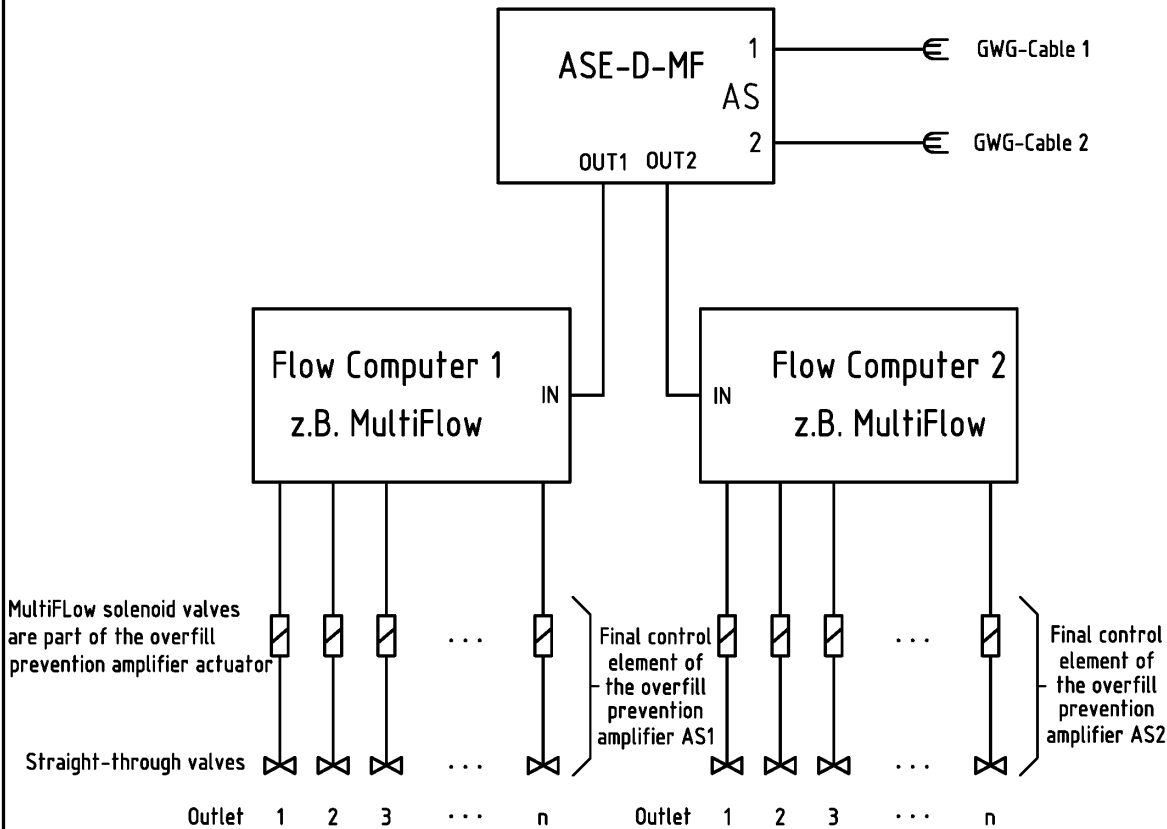
Name :
Larsen

Drawing No.

E51.250857

Rev.

Overfill prevention amplifier type ASE-D-MF with "open collector" outputs



When overfill prevention amplifier type ASE-E-MF is the second channel (OUT 2, MultiFlow 2, GWG-cable 2) not applicable.

Overfill prevention amplifier type ASE-M-MF

FMC Technologies

F.A. Sening GmbH
D-25474 Ellerbek, Germany

Block diagram

Changed :
ECN No. Date Name

Date :
18.06.2009

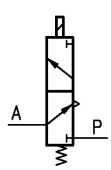
Name :
Larsen

Drawing No.
E 51.351143

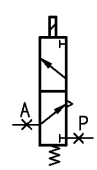
Rev.

DOK-401
"Schutzvermerk nach DIN ISO 16016 beachten"

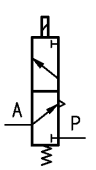
"Schutzvermerk nach DIN 34 beachten"



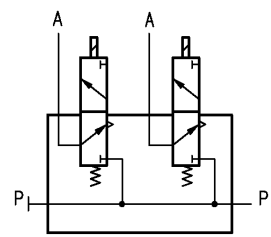
MVS1-E11-12



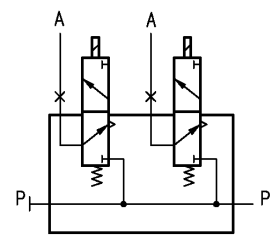
MVS1-E11-122
MVS1-E11-262



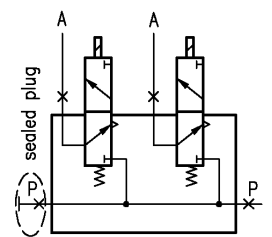
MVS1-S11-12K
MVS1-S11-24K



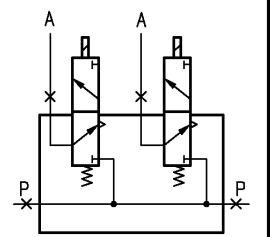
MVS2-E12-12



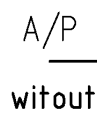
MVS2-E12-122




MVS2-E12-123
MVS2-E12-263



MVS2-E12-124
MVS2-E12-264



without



with

Swirvellung screw-fitting (e.g. Ermeto)

MVxx-xxx-xxx

↑

↑

↑

↑

↑

↑

↑

Optional: Number of swirvellung screw-fittings (e.g. Ermeto)
K = no screw fitting

Solenoid voltage 26 = 26 Volt 24 = 24 Volt
12 = 12 Volt
06 = 6 Volt

Number of air outputs

Number of air inputs

Explosion protection (E=EX; S=Standard)

Number of solenoid valves

S = Standard (without manual operation)
N = Emergency operation (with manual operation)

Solenoid valves

Connection diagrams & Order codes

FMC EnergySystems

FMC Measurement Solutions

F.A. Sening GmbH

D-25474 Ellerbek, Germany

Changed :
28.09.04 NB;

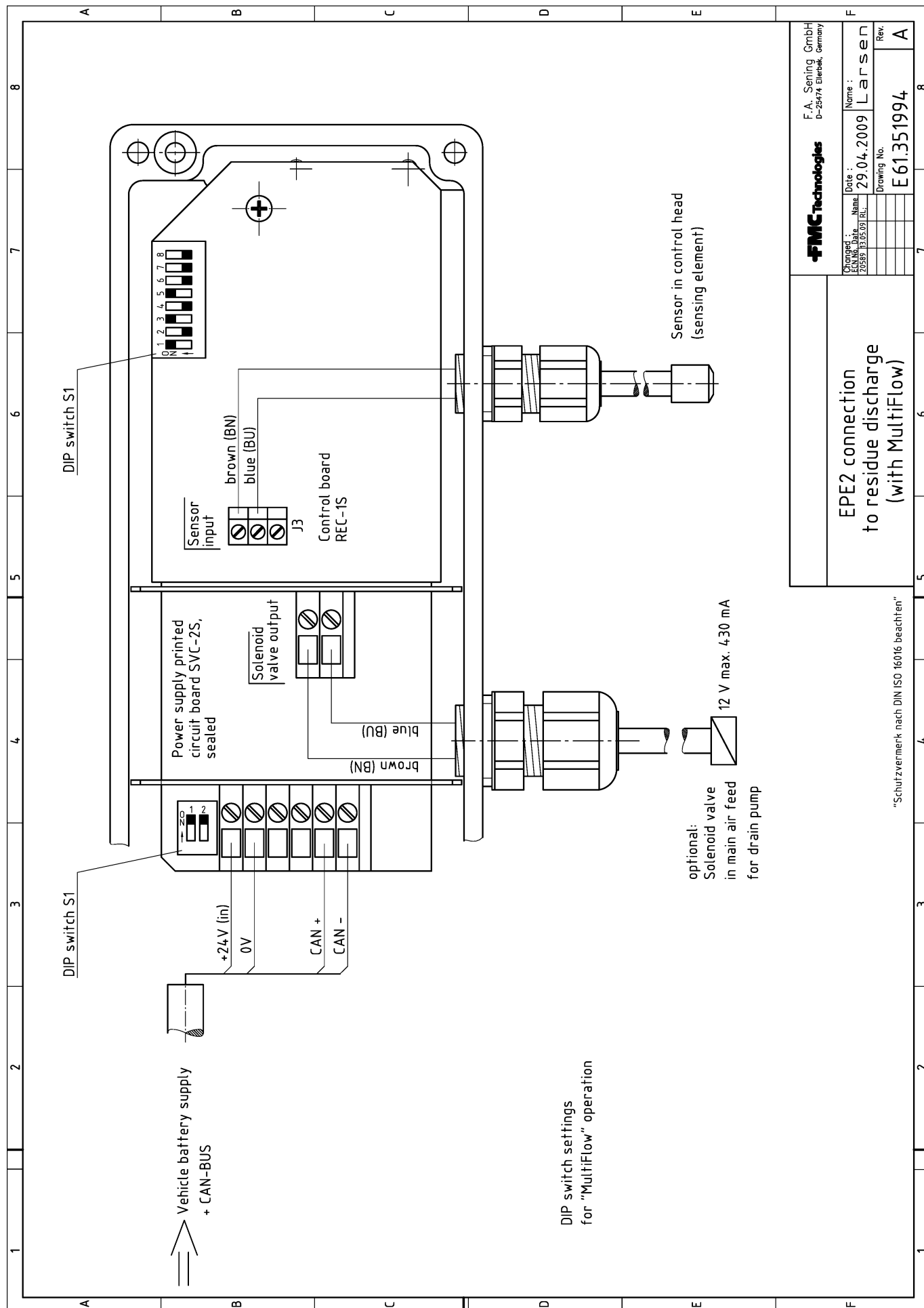
Date :
27.07.2004

Name :
H. Oelting

Drawing No.
E51.351740

Rev.
A

E61.351994 - EPE2 connection to residue discharge (with MultiFlow)



F. A. Sening GmbH
D-25474 Eilbek, Germany

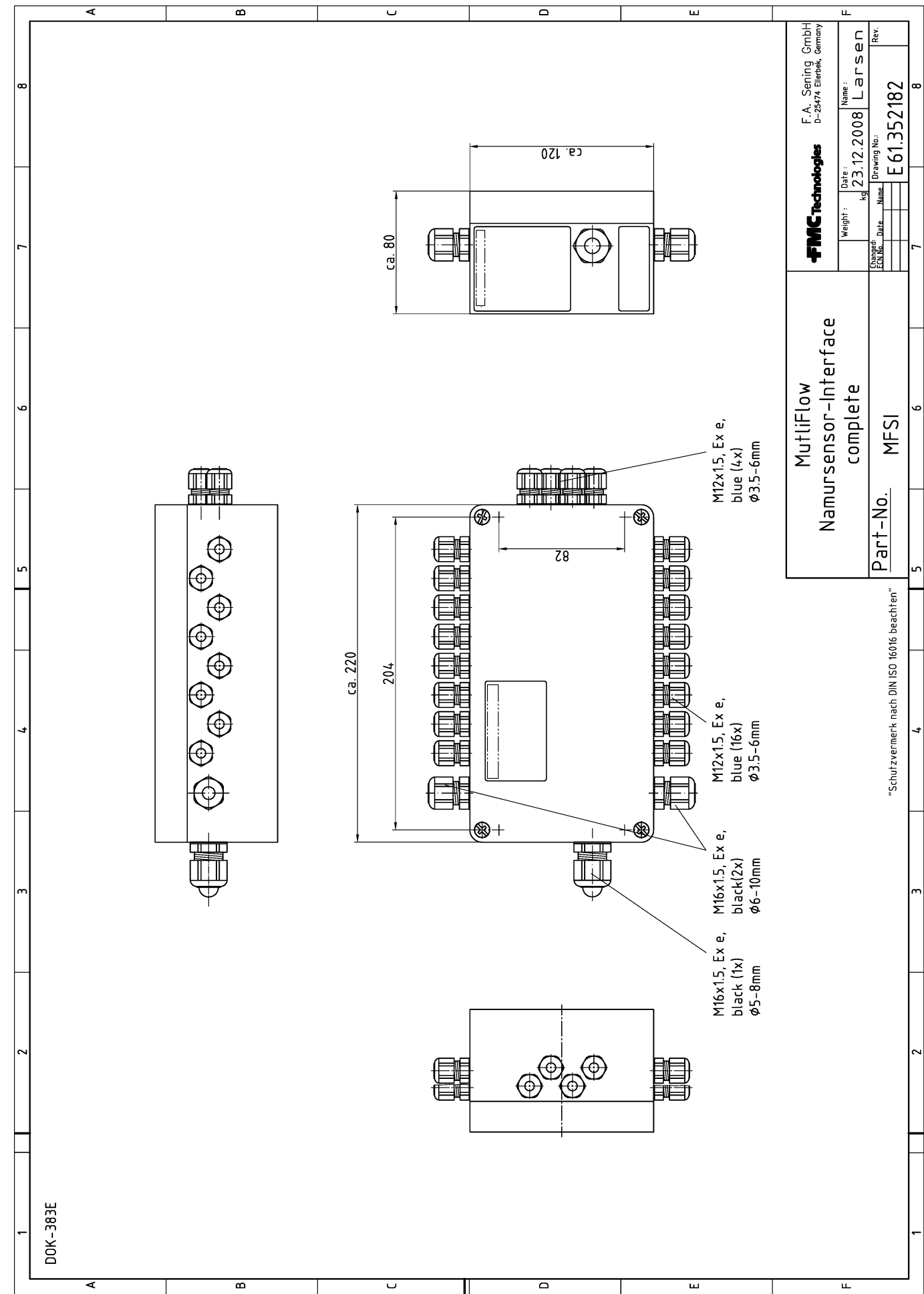
FMC Technologies

Changed by	Checked by	Date	Name	Rev.
20558	13.05.09	29.04.2009	Larsen	A
Drawing No.				E61.351994

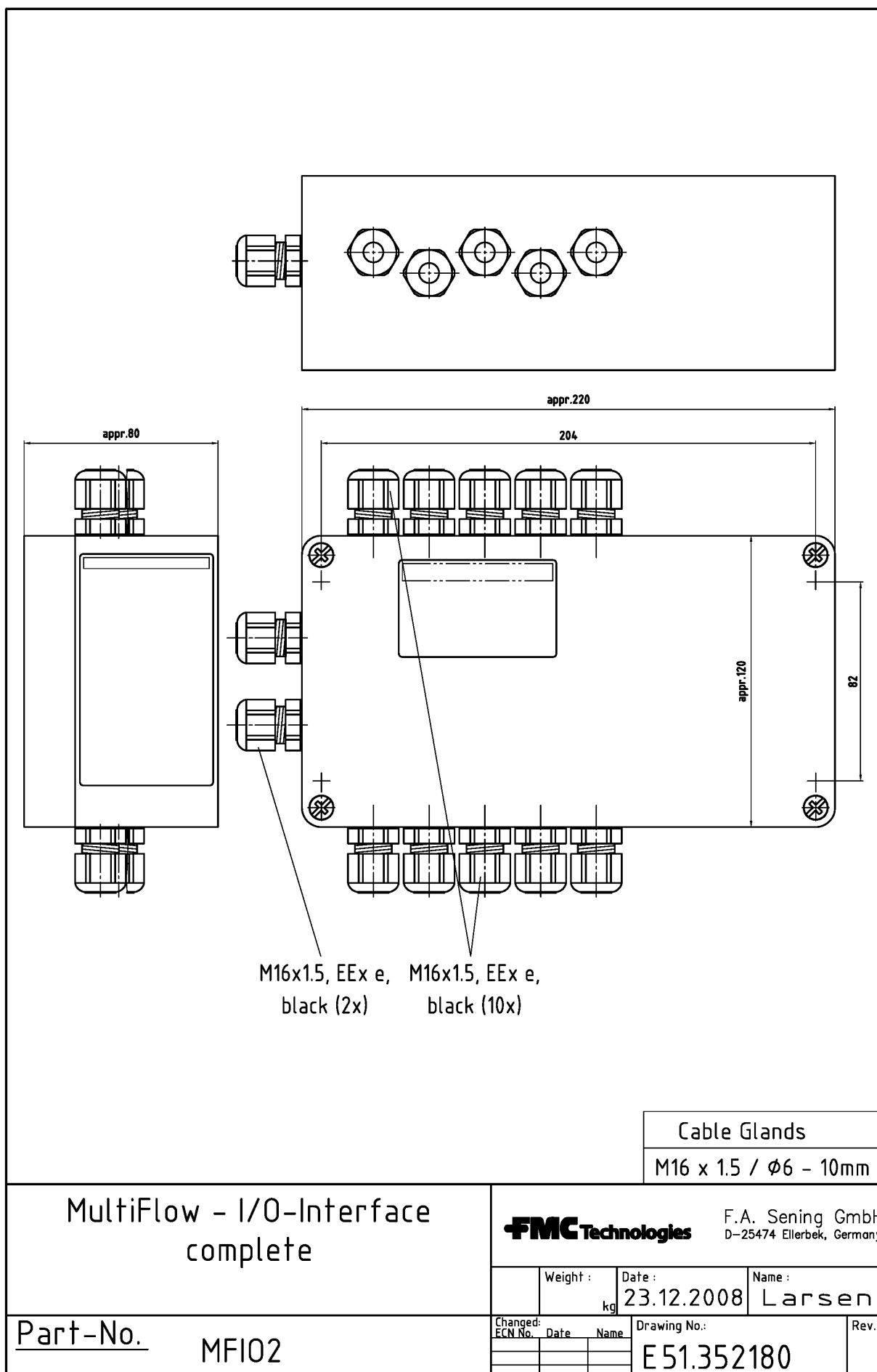
EPE2 connection
to residue discharge
(with MultiFlow)

"Schutzvermerk nach DIN ISO 16016 beachten"

E61.352182 - MultiFlow Namursensor-Interface complete - MFSI









Approvals

E W & M seal form (blank DOK-386E)



Seal Receipt
MultiFlow
Electronic Register

Issue/Rev. 2.21 (07/03)

MN F09 003 US / DOK-386E

Electronic Weights & Measures Seal

as

appendix to measurement
system certificate

Internal state type approval

5.602

97.10

MultiFlow

The seal was produced by:

Signature and identification of official:

**It is essential to observe the following
instructions when checking the seal status:**

- The seal is not violated by the inspection.
- The seal impression opposite for the Multiflow can be repeated with the following key combination:
Switch On <F1>, (Seal Status)
<F1>, (Print)
- The code number in the 'Seal status' area on the copy and on the original must match (double-sized printing).
- The text under the code number must read:
The seal is approved!
- If the details do not match, the seal has been broken. Appropriate action must be initiated.

IMPORTANT:

**Illegal modification of the
W & M data or the W & M seal
is a punishable offence!**

Measurement Solutions

F. A. Sening GmbH

Regentstrasse 1 • 25474 Ellerbek, Germany

Tel.: +49 4101 304-0 • Fax: +49 4101 304-133 • E-Mail: info.ellerbek@fmcti.com • www.fmctechnologies.com/seningattp

Electronic Seal

as

appendix to measurement
system documentation

The seal was produced by:

Signature and identification of official:

**It is essential to observe the following
instructions when checking the seal status:**

- The seal is not violated by the inspection.
- The seal impression opposite for the Multiflow can be repeated with the following key combination:
Switch On <F1>, (Seal Status)
<F1>, (Print)
- The code number in the 'Seal status' area on the copy and on the original must match (double-sized printing).
- The text under the code number must read:
* The seal is approved !
- If the details do not match, the seal has been broken. Appropriate action must be initiated.

IMPORTANT:

**Illegal modification
of the sealed data is a
punishable offence !**

Measurement Solutions

F. A. Sening GmbH

Regentstrasse 1 • 25474 Ellerbek, Germany

Tel.: +49 4101 304-0 • Fax: +49 4101 304-133 • E-Mail: info.ellerbek@fmcti.com • www.fmctechnologies.com/seningatp

Further authorisation documents

As a result of **standardisation** of electronic counters within the European Union development has taken place strictly in accordance with the latest directives for the authorisation of counters for calibrated transport within the EU (OIML R117). This has guaranteed that the MultiFlow will fulfil the legislators' requirements both now and in the future regarding counters for transport for which calibration is mandatory.

These authorisation documents have been compiled as copies in an extra document "*Multiflow authorisations*" **DOK-464DE**, in a detailed and complete format, together with all appendices, and can be requested separately.

Internally to Germany the type approval of the electrical counter with additional equipment comes under volume measuring devices:

Approval mark:

5.602

97.10

Type designation:

MultiFlow

Further authorisations for other countries e.g. for Great Britain, Belgium, etc are available also.

EG - Konformitätserklärung

EC - Declaration of Conformity



im Sinne der EG-Richtlinie über explosionsgeschützte Geräte
nach 94/9/EG (ATEX)
as defined by non-electrical explosion protected Equipment Directive 94/9/EC

Der Hersteller / The Manufacturer

F.A. Sening GmbH, Regentstraße 1, D-25474 Ellerbek

erklärt hiermit, dass das (die) explosionsgeschützte(n) Gerät(e)
herewith we declare, that the explosion protected Equipment

MultiFlow

Produktbezeichnung: <i>Product:</i>	Zündschutzart: <i>Type of protection:</i>	EG – Baumusterbescheinigung* <i>EC – Type Test Approval</i>
Bediengerät Typ GD1.-	 II 2 G Ex ib IIB T4	TÜV 97 ATEX 1175
Steuergerät Multiflow	 II 2 G Ex d [ib] IIB T4	TÜV 97 ATEX 1176

* einschließlich aller Ergänzungen / *including all supplements*

in der gelieferten Ausführung den folgenden Sicherheitsanforderungen entspricht (entsprechen):
corresponds to following safety requirements in the delivered implementation:

Grundlegende Normen / CENELEC: EN 60079-0, EN 60079-1, EN 60079-11
Basic norms:

Angewandte harmonisierte Normen, insbesondere:
Applied harmonized standards, in particular:


Andere angewandte Bestimmungen / EG-Richtlinien:
Other applied appointments / EC-Directives:

Benannte Stelle / Produktionsüberwachung: Physikalisch-Technische Bundesanstalt
Notified Body Production control PTB 99 ATEX Q001; CE 0102

Prüfungen/Überwachung/Kontrollen während der Fertigung: Hersteller
Examination/inspection/tests during manufacturing: Manufacturer

Die zugehörige Betriebsanleitung enthält wichtige sicherheitstechnische Hinweise und Vorschriften für die
Aufstellung, Inbetriebnahme Wartung und Instandhaltung der (s) Gerät(es).
*The appropriate operator's manual contains important safety technical notes and regulations for the installation, placing into
operation, maintenance and maintenance of the equipment.*

- Geschäftsführer
General Manager


(F. Jönsson)

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Contact information is subject to change. For the most current contact information, visit our website at www.fmctechnologies.com/measurementsolutions and click on the "Contact Us" link in the left-hand column.

Headquarters:

500 North Sam Houston Parkway West, Suite 100 Houston, TX 77067 USA, Phone: +1 (281) 260 2190, Fax: +1 (281) 260 2191

Measurement Products and Equipment:

Erie, PA USA +1 (814) 898 5000

Ellerbek, Germany +49 (4101) 3040

Barcelona, Spain +34 (93) 201 0989

Beijing, China +86 (10) 6500 2251

Buenos Aires, Argentina +54 (11) 4312 4736

Burnham, England +44 (1628) 603205

Dubai, United Arab Emirates +971 (4) 883 0303

Los Angeles, CA USA +1 (310) 328 1236

Melbourne, Australia +61 (3) 9807 2818

Moscow, Russia +7 (495) 5648705

Singapore +65 6861 3011

Integrated Measurement Systems:

Corpus Christi, TX USA +1 (361) 289 3400

Kongsberg, Norway +47 (32) 28 67 00

San Juan, Puerto Rico +1 (787) 772 8100

Dubai, United Arab Emirates +971 (4) 883 0303

Visit our website at www.fmctechnologies.com/measurementsolutions

Printed in Germany © 03/13 F. A. Sening GmbH, Inc. All rights reserved. MN F09 002 US / DOK-383E Issue/Rev. 3.62 (02/13)